<PRO

<PREAMB>

[6450-01-P]

DEPARTMENT OF ENERGY

10 CFR Part 431

[EERE-2020-BT-STD-0008]

RIN 1904-AF01

Energy Conservation Program: Energy Conservation Standards for Computer Room Air Conditioners

AGENCY: Office of Energy Efficiency and Renewable Energy, Department of Energy.

ACTION: Notice of proposed rulemaking and request for comment.

SUMMARY: The Energy Policy and Conservation Act, as amended (EPCA), prescribes energy conservation standards for various consumer products and certain commercial and industrial equipment, including small, large, and very large commercial package air conditioning and heating equipment, of which computer room air conditioners (CRACs) are a category. EPCA requires the U.S. Department of Energy (DOE or the Department) to consider the need for amended standards each time the relevant industry standard is amended with respect to the standard levels or design requirements applicable to that equipment, or periodically under a six-year-lookback review provision. In this document, DOE is proposing amended energy conservation standards for CRACs that rely on a new efficiency metric and are equivalent to those levels specified in the industry standard. DOE has preliminarily determined that it lacks the clear and convincing evidence required by the statute to adopt standards more stringent than the levels specified in the industry standard. This document also announces a public meeting webinar to receive comment on these proposed standards and associated analyses and results.

DATES: *Meeting:* DOE will hold a public meeting via webinar on Wednesday, April 13, 2022, from 1:00 p.m. to 4:00 p.m. See section VII, "Public Participation," for webinar registration information, participant instructions, and information about the capabilities available to webinar participants

Comments: DOE will accept written comments, data, and information regarding this notice of proposed rulemaking (NOPR) on and before [**INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER***].

Comments regarding the likely competitive impact of the proposed standard should be sent to the Department of Justice contact listed in the **ADDRESSES** section on or before [**INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER***].

ADDRESSES: Interested persons are encouraged to submit comments using the Federal eRulemaking Portal at *www.regulations.gov*. Follow the instructions for submitting comments. Alternatively, interested persons may submit comments by email to the following address: *2019ASHRAE2020STD0008@ee.doe.gov*. Include docket number EERE–2020–BT–STD-0008 and/or RIN 1904-AF01 in the subject line of the message. Submit electronic comments in WordPerfect, Microsoft Word, PDF, or ASCII file format, and avoid the use of special characters or any form of encryption.

No telefacsimiles (faxes) will be accepted. For detailed instructions on submitting comments and additional information on this process, see section VII (Public Participation) of this document.

Although DOE has routinely accepted public comment submissions through a variety of mechanisms, including the Federal eRulemaking Portal, email, postal mail and hand delivery/courier, the Department has found it necessary to make temporary modifications to the comment submission process in light of the ongoing COVID-19 pandemic. DOE is currently suspending receipt of public comments via postal mail and hand delivery/courier. DOE is currently accepting only electronic submissions at this time. If a commenter finds that this change poses an undue hardship, please contact Appliance Standards Program staff at (202) 586-1445 to discuss the need for alternative arrangements. Once the COVID-19 pandemic health emergency is resolved, DOE anticipates resuming all of its regular options for public comment submission, including postal mail and hand delivery/courier.

Docket: The docket for this activity, which includes *Federal Register* notices, comments, and other supporting documents/materials, is available for review at *www.regulations.gov*. All documents in the docket are listed in the *www.regulations.gov* index. However, not all documents listed in the index may be publicly available, such as information that is exempt from public disclosure.

The docket webpage can be found at: *www.regulations.gov/#!docketDetail;D=EERE-2020-BT-STD-0008*. The docket webpage contains instructions on how to access all documents, including public comments, in the docket. See section VII.D "Public Participation," for information on how to submit comments through *www.regulations.gov*.

EPCA requires the Attorney General to provide DOE a written determination of whether the proposed standard is likely to lessen competition. The U.S. Department of Justice Antitrust Division invites input from market participants and other interested persons with views on the likely competitive impact of the proposed standard for CRACs. Interested persons may contact the Division at *energy.standards@usdoj.gov* on or before the date specified in the **DATES** section. Please indicate in the "Subject" line of your email the title and Docket Number of this proposed rulemaking.

FOR FURTHER INFORMATION CONTACT: Ms. Catherine Rivest, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building

Technologies Office, EE-5B, 1000 Independence Avenue, SW., Washington, DC, 20585-0121. Telephone: (202) 586-7335. Email: *ApplianceStandardsQuestions@ee.doe.gov*.

Mr. Eric Stas, U.S. Department of Energy, Office of the General Counsel, GC-33, 1000 Independence Avenue, SW., Washington, DC, 20585-0121. Telephone: (202) 586-5827. Email: *Eric.Stas@hq.doe.gov*

For further information on how to submit a comment, review other public comments and the docket, or participate in the webinar, contact the Appliance and Equipment Standards Program staff at (202) 287-1445 or by email: *ApplianceStandardsQuestions@ee.doe.gov*.

SUPPLEMENTARY INFORMATION:

Table of Contents

I. Synopsis of the Proposed Rule

Title III, Part C[1] of EPCA[2] established the Energy Conservation Program for Certain Industrial Equipment. (42 U.S.C. 6311-6317) Such equipment includes CRACs, the subject of this proposed rulemaking. (42 U.S.C. 6311(1)(B)-(D))

[1] For editorial reasons, upon codification in the U.S. Code, Part C was redesignated Part A-1.
[2] All references to EPCA in this document refer to the statute as amended through the Infrastructure Investment and Jobs Act, Pub. L. 117-58 (Nov. 15, 2021).

Pursuant to EPCA, DOE is triggered to consider amending the energy conservation standards for certain types of commercial and industrial equipment, including the equipment at issue in this document, whenever the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) amends the standard levels or design requirements prescribed in ASHRAE Standard 90.1, "Energy Standard for Buildings Except Low-Rise Residential Buildings" (ASHRAE Standard 90.1). Under a separate provision of EPCA, DOE is required to review the existing energy conservation standards for those types of covered equipment subject to ASHRAE Standard 90.1 every six years to determine whether those standards need to be amended. (42 U.S.C. 6313(a)(6)(A)-(C)) For each type of equipment, EPCA directs that if ASHRAE Standard 90.1 is amended, DOE must adopt amended energy conservation standards at the new efficiency level in ASHRAE Standard 90.1, unless clear and convincing evidence supports a determination that adoption of a more-stringent efficiency level would produce significant additional energy savings and be technologically feasible and economically justified. (42 U.S.C. 6313(a)(6)(A)(ii)) If DOE adopts as a uniform national standard the efficiency level specified in the amended ASHRAE Standard 90.1, DOE must establish such standard not later than 18 months after publication of the amended industry standard. (42 U.S.C. 6313(a)(6)(A)(ii)(I)) If DOE determines that a more-stringent standard is appropriate under the statutory criteria, DOE must establish such more-stringent standard not later than 30 months after publication of the revised ASHRAE Standard 90.1. (42 U.S.C. 6313(a)(6)(B)(i)) ASHRAE last updated ASHRAE Standard 90.1 on October 24, 2019 (ASHRAE Standard 90.1-2019), thereby triggering DOE's previously referenced obligations pursuant to EPCA to determine for CRACs, whether: (1) the amended industry standard should be adopted; or (2) clear and convincing evidence exists to justify more-stringent standard levels.

The current Federal energy conservation standards for CRACs are set forth at title 10 of the Code of Federal Regulations (CFR), 10 CFR 431.97 and, as specified in 10 CFR 431.96, those standards are denominated in terms of Sensible Coefficient of Performance (SCOP) and based on the rating conditions in American National Standards Institute (ANSI)/ASHRAE 127-2007, "Method of Testing for Rating Computer and Data Processing Room Unitary Air Conditioners" (ANSI/ASHRAE 127-2007). However, the efficiency levels for CRACs set forth in ASHRAE Standard 90.1-2019 are specified in terms of Net Sensible Coefficient of Performance (NSenCOP) and based on rating conditions in Air-Conditioning, Heating, and Refrigeration Institute (AHRI) Standard 1360-2017, "Performance Rating of Computer and Data Processing Room Air Conditioners" (AHRI 1360-2017), which differ from the rating conditions specified in ANSI/ASHRAE 127-2007 for most configurations of CRACs. Therefore, while SCOP and NSenCOP are both ratios of the net sensible cooling capacity (NSCC) to the power consumed by the unit, they are measured at different rating conditions for most configurations of CRACs[3] and correspondingly provide different representations of efficiency. DOE has compared the stringency of standards in ASHRAE Standard 90.1-2019 (in terms of NSenCOP) to the corresponding current Federal energy conservation standards (in terms of SCOP) by conducting a crosswalk analysis. Based on the results of that analysis, DOE has tentatively concluded that the ASHRAE Standard 90.1-2019 levels are equivalent in stringency to the current Federal standards for six equipment classes and are more stringent than the current Federal standards for the remaining 46 equipment classes of CRACs.

[3] Additionally, for water-cooled and glycol-cooled CRACs, NSenCOP includes power adders to account for power that would be consumed in field installations by pumps and heat rejection component (e.g., cooling tower or dry cooler) fans. *See* section III.C of this NOPR for further discussion of the evaluation of differences between SCOP and NSenCOP.

For all CRAC equipment classes, DOE has tentatively determined that there is not clear and convincing evidence of significant additional energy savings to justify amended standards for CRACs that are more stringent than the ASHRAE Standard 90.1-2019 levels. Clear and convincing evidence would exist only where the specific facts and data made available to DOE regarding a particular ASHRAE amendment demonstrate that there is no substantial doubt that a standard more stringent than that contained in the ASHRAE Standard 90.1 amendment is permitted because it would result in a significant additional amount of energy savings, is technologically feasible and economically justified.

DOE normally performs multiple in-depth analyses to determine whether there is clear and convincing evidence to support more stringent energy conservation standards (i.e., whether more stringent standards would produce significant additional conservation of energy and be technologically feasible and economically justified). However, as discussed in this notice in section V.A, due to the lack of available market and performance data, DOE is unable to conduct the analysis necessary to evaluate the potential energy savings or evaluate whether more stringent standards would be technologically feasible or economically justified, with sufficient certainty. Therefore, in accordance with the statutory provisions discussed in this section and elsewhere in this document, DOE is proposing amended energy conservation standards for CRACs corresponding to the efficiency levels specified for CRACs in ASHRAE Standard 90.1-2019. The proposed standards, which are expressed in NSenCOP, are presented in Table I-1 and Table I-2. These proposed standards, if adopted, would apply to all CRACs listed in Table I-1 and Table I-2 manufactured in, or imported into, the United States starting on the tentative compliance date of 360 days after the publication date of the final rule adopting amended energy conservation standards. *See* section V.D of this NOPR for a discussion on the applicable lead-times considered to determine this compliance date.

Table I-1: Proposed Energy Conservation Standards for Floor-Mounted CRACs

Equipment type	Net sensible cooling capacity[4]	Minimum NSenCOP efficiency		Net sensible cooling capacity	Minimum NSenCOP efficiency	
		Downflow	Upflow ducted		Upflow non-ducted	Horizontal flow
Air-Cooled	<80,000 Btu/h[5]	2.70	2.67	<65,000 Btu/h	2.16	2.65
	≥80,000 Btu/h and <295,000 Btu/h	2.58	2.55[6]	≥65,000 Btu/h and <240,000 Btu/h	2.04	2.55
	≥295,000 Btu/h and <930,000 Btu/h	2.36	2.33	≥240,000 Btu/h and <760,000 Btu/h	1.89	2.47
Air-Cooled with Fluid Economizer	<80,000 Btu/h	2.70	2.67	<65,000 Btu/h	2.09[6]	2.65
	≥80,000 Btu/h and <295,000 Btu/h	2.58	2.55[6]	≥65,000 Btu/h and <240,000 Btu/h	1.99[6]	2.55
	≥295,000 Btu/h and <930,000 Btu/h	2.36	2.33	≥240,000 Btu/h and <760,000 Btu/h	1.81	2.47
Water-Cooled	<80,000 Btu/h	2.82	2.79	<65,000 Btu/h	2.43	2.79
	≥80,000 Btu/h and <295,000 Btu/h	2.73	2.70[6]	≥65,000 Btu/h and <240,000 Btu/h	2.32	2.68
	≥295,000 Btu/h and <930,000 Btu/h	2.67	2.64	≥240,000 Btu/h and <760,000 Btu/h	2.20	2.60

[4] For downflow and upflow-ducted CRACs, the NSCC measured per AHRI 1360-2017 and the latest draft of AHRI 1360 is higher than the NSCC measured per the current Federal test procedure (which references ANSI/ASHRAE 127-2007). Therefore, to ensure equipment currently covered by Federal standards is not removed from coverage, DOE translated the currently applicable upper capacity limit for these classes (760,000 Btu/h) to NSCC as measured per AHRI 1360-2017 and the latest draft of AHRI 1360, resulting in a crosswalked upper capacity boundary of 930,000 Btu/h. Consequently, DOE has used 930,000 Btu/h as the translated upper capacity limit for downflow and upflow-ducted CRACs in the analysis presented in this notice. For up-flow non-ducted CRACs, because there is no change in return air temperature conditions between ANSI/ASHRAE 127-2007 and AHRI 1360-Draft, the capacity boundaries in ASHRAE Standard 90.1-2019 remain the same as those specified in the current Federal standards, and DOE correspondingly proposes to retain the current capacity boundaries. For horizontal-flow CRACs, DOE does not currently prescribe standards; therefore, a crosswalk of current capacity boundaries is not applicable. See section III.C.5 of this NOPR for further discussion of DOE's crosswalk analysis of capacity boundaries for CRACs.

[5] Btu/h refers to "British thermal units per hour."

[6] The proposed standard for this equipment class is of equivalent stringency to the currently applicable Federal standard – the proposed level is a translation from the current metric (SCOP) to the proposed metric (NSenCOP) and aligns with the corresponding level in ASHRAE Standard 90.1.

Water-Cooled with Fluid Economizer	<80,000 Btu/h	2.77	2.74	<65,000 Btu/h	2.35	2.71
	≥80,000 Btu/h and <295,000 Btu/h	2.68	2.65[6]	≥65,000 Btu/h and <240,000 Btu/h	2.24	2.60
	≥295,000 Btu/h and <930,000 Btu/h	2.61	2.58	≥240,000 Btu/h and <760,000 Btu/h	2.12	2.54
Glycol-Cooled	<80,000 Btu/h	2.56	2.53	<65,000 Btu/h	2.08	2.48
	≥80,000 Btu/h and <295,000 Btu/h	2.24	2.21	≥65,000 Btu/h and <240,000 Btu/h	1.90	2.18
	≥295,000 Btu/h and <930,000 Btu/h	2.21	2.18	≥240,000 Btu/h and <760,000 Btu/h	1.81	2.18
Glycol-Cooled with Fluid Economizer	<80,000 Btu/h	2.51	2.48	<65,000 Btu/h	2.00	2.44
	≥80,000 Btu/h and <295,000 Btu/h	2.19	2.16	≥65,000 Btu/h and <240,000 Btu/h	1.82	2.10
	≥295,000 Btu/h and <930,000 Btu/h	2.15	2.12	≥240,000 Btu/h and <760,000 Btu/h	1.73	2.10

Table I-2: Proposed Energy Conservation Standards for Ceiling-Mounted CRACs

Equipment type	**Net sensible cooling capacity**	**Minimum NSenCOP efficiency**	
		Ducted	**Non-Ducted**
Air-Cooled with Free Air Discharge Condenser	<29,000 Btu/h	2.05	2.08
	≥29,000 Btu/h and <65,000 Btu/h	2.02	2.05
	≥65,000 Btu/h	1.92	1.94
Air-Cooled with Free Air Discharge Condenser and Fluid Economizer	<29,000 Btu/h	2.01	2.04
	≥29,000 Btu/h and <65,000 Btu/h	1.97	2.00
	≥65,000 Btu/h	1.87	1.89
Air-Cooled with Ducted Condenser	<29,000 Btu/h	1.86	1.89
	≥29,000 Btu/h and <65,000 Btu/h	1.83	1.86
	≥65,000 Btu/h	1.73	1.75
Air-Cooled with Ducted Condenser and Fluid Economizer	<29,000 Btu/h	1.82	1.85
	≥29,000 Btu/h and <65,000 Btu/h	1.78	1.81

	≥65,000 Btu/h	1.68	1.70
Water-Cooled	<29,000 Btu/h	2.38	2.41
	≥29,000 Btu/h and <65,000 Btu/h	2.28	2.31
	≥65,000 Btu/h	2.18	2.20
Water-Cooled with Fluid Economizer	<29,000 Btu/h	2.33	2.36
	≥29,000 Btu/h and <65,000 Btu/h	2.23	2.26
	≥65,000 Btu/h	2.13	2.16
Glycol-Cooled	<29,000 Btu/h	1.97	2.00
	≥29,000 Btu/h and <65,000 Btu/h	1.93	1.98
	≥65,000 Btu/h	1.78	1.81
Glycol-Cooled with Fluid Economizer	<29,000 Btu/h	1.92	1.95
	≥29,000 Btu/h and <65,000 Btu/h	1.88	1.93
	≥65,000 Btu/h	1.73	1.76

II. Introduction

The following section briefly discusses the statutory authority underlying this proposed rule, as well as some of the relevant historical background related to the establishment of energy conservation standards for CRACs.

A. Authority

EPCA, Pub. L. 94-163 (42 U.S.C. 6291-6317, as codified), among other things, authorizes DOE to regulate the energy efficiency of a number of consumer products and certain industrial equipment. Title III, Part C of EPCA, added by Pub. L. 95-619, Title IV, section 441(a) (42 U.S.C. 6311-6317, as codified), established the Energy Conservation Program for Certain Industrial Equipment, which sets forth a variety of provisions designed to improve energy efficiency. This covered equipment includes small, large, and very large commercial package air conditioning and heating equipment, which includes CRACs, the subject of this document. (42 U.S.C. 6311(1)(B)-(D))

Under EPCA, the energy conservation program consists essentially of four parts: (1) testing; (2) labeling; (3) the establishment of Federal energy conservation standards, and (4) certification and enforcement procedures. Relevant provisions of EPCA specifically include definitions (42 U.S.C. 6311), energy conservation standards (42 U.S.C. 6313), test procedures (42 U.S.C. 6314), labeling provisions (42 U.S.C. 6315), and the authority to require information and reports from manufacturers (42 U.S.C. 6316).

Federal energy efficiency requirements for covered equipment established under EPCA generally supersede State laws and regulations concerning energy conservation testing, labeling, and standards. (42 U.S.C. 6316(a) and (b); 42 U.S.C. 6297) DOE may, however, grant waivers of Federal preemption in limited circumstances for particular State laws or regulations, in accordance with the procedures and other provisions set forth under EPCA. (42 U.S.C. 6297(d); 42 U.S.C. 6316(a); 42 U.S.C. 6316(b)(2)(D))

Subject to certain criteria and conditions, DOE is required to develop test procedures to measure the energy efficiency, energy use, or estimated annual operating cost of covered equipment. (42 U.S.C. 6314) Manufacturers of covered equipment must use the Federal test procedures as the basis for: (1) certifying to DOE that their equipment complies with the applicable energy conservation standards adopted pursuant to EPCA (42 U.S.C. 6316(b); 42 U.S.C. 6296), and (2) making representations about the energy use or efficiency of that equipment (42 U.S.C. 6314(d)). Similarly, DOE uses these test procedures to determine whether the equipment complies with relevant standards promulgated under EPCA. The DOE test procedures for CRACs appear at 10 CFR part 431, subpart F.

DOE is to consider amending the energy efficiency standards for certain types of commercial and industrial equipment, including the equipment at issue in this document, whenever ASHRAE amends the standard levels or design requirements prescribed in ASHRAE Standard 90.1, and at a minimum, every six years. (42 U.S.C. 6313(a)(6)(A) - (C)) ASHRAE Standard 90.1 sets industry energy efficiency levels for small, large, and very large commercial package air-conditioning and heating equipment, packaged terminal air conditioners, packaged terminal heat pumps, warm air furnaces, packaged boilers, storage water heaters, instantaneous water heaters, and unfired hot water storage tanks (collectively "ASHRAE equipment"). For each type of listed equipment, EPCA directs that if ASHRAE amends ASHRAE Standard 90.1, DOE must adopt amended standards at the new ASHRAE efficiency levels, unless DOE determines, supported by clear and convincing evidence[7], that adoption of a more stringent level would produce significant additional conservation of energy and would be technologically feasible and economically justified. (42 U.S.C. 6313(a)(6)(A)(ii) If DOE makes such a determination, it must publish a final rule to establish the more stringent standards. (42 U.S.C. 6313(a)(6)(B)(i))

Although EPCA does not explicitly define the term "amended" in the context of what type of revision to ASHRAE Standard 90.1 would trigger DOE's obligation, DOE's longstanding interpretation has been that the statutory trigger is an amendment to the

[7] The clear and convincing threshold is a heightened standard, and would only be met where the Secretary has an abiding conviction, based on available facts, data, and DOE's own analyses, that it is highly probable an amended standard would result in a significant additional amount of energy savings, and is technologically feasible and economically justified. *American Public Gas Association v. U.S. Dep't of Energy*, No. 20-1068, 2022 WL 151923, at *4 (D.C. Cir. January 18, 2022) (citing *Colorado v. New Mexico*, 467 U.S. 310, 316, 104 S.Ct. 2433, 81 L.Ed.2d 247 (1984)).

standard applicable to that equipment under ASHRAE Standard 90.1 that increases the energy efficiency level for that equipment. *See* 72 FR 10038, 10042 (March 7, 2007). If the revised ASHRAE Standard 90.1 leaves the energy efficiency level unchanged (or lowers the energy efficiency level) as compared to the energy efficiency level specified by the uniform national standard adopted pursuant to EPCA, regardless of the other amendments made to the ASHRAE Standard 90.1 requirement (*e.g.,* the inclusion of an additional metric) DOE has stated that it does not have authority to conduct a rulemaking pursuant to 42 U.S.C. 6313(a)(6)(A) to consider a higher standard for that equipment, though this does not limit DOE's authority to consider higher standards as part of a six-year lookback rulemaking analysis (pursuant to 42 U.S.C. 6313(a)(6)(C); see discussion in the following paragraphs). *See* 74 FR 36312, 36313 (July 22, 2009) and 77 FR 28928, 28937 (May 16, 2012). If an amendment to ASHRAE Standard 90.1 changes the metric for the standard on which the Federal requirement was based, DOE performs a crosswalk analysis to determine whether the amended metric under ASHRAE Standard 90.1 results in an energy efficiency level more stringent than the current DOE standard.

Under EPCA, DOE must also review energy efficiency standards for CRACs every six years and either: (1) issue a notice of determination that the standards do not need to be amended as adoption of a more stringent level is not supported by clear and convincing evidence; or (2) issue a notice of proposed rulemaking including new proposed standards based on certain criteria and procedures in subparagraph (B).[8] (42 U.S.C. 6313(a)(6)(C))

---

[8] In relevant part, subparagraph (B) specifies that: (1) in making a determination of economic justification, DOE must consider, to the maximum extent practicable, the benefits and burdens of an amended standard based on the seven criteria described in EPCA; (2) DOE may not prescribe any standard that increases the energy use or decreases the energy efficiency of a covered equipment; and (3) DOE may not prescribe any standard that interested persons have established by a preponderance of evidence is likely to result in the

In deciding whether a more-stringent standard is economically justified, under either the provisions of 42 U.S.C. 6313(a)(6)(A) or 42 U.S.C. 6313(a)(6)(C), DOE must determine whether the benefits of the standard exceed its burdens. DOE must make this determination after receiving comments on the proposed standard, and by considering, to the maximum extent practicable, the following seven factors:

(1) The economic impact of the standard on manufacturers and consumers of products subject to the standard;

(2) The savings in operating costs throughout the estimated average life of the covered equipment in the type (or class) compared to any increase in the price, initial charges, or maintenance expenses for the covered equipment that are likely to result from the standard;

(3) The total projected amount of energy savings likely to result directly from the standard;

(4) Any lessening of the utility or the performance of the covered equipment likely to result from the standard;

(5) The impact of any lessening of competition, as determined in writing by the Attorney General, that is likely to result from the standard;

(6) The need for national energy conservation; and

(7) Other factors the Secretary of Energy considers relevant.

---

unavailability in the United States of any product type (or class) of performance characteristics (including reliability, features, sizes, capacities, and volumes) that are substantially the same as those generally available in the United States. (42 U.S.C. 6313(a)(6)(B)(ii)-(iii))

(42 U.S.C. 6313(a)(6)(B)(ii)(I)–(VII))

Further, EPCA establishes a rebuttable presumption that an energy conservation standard is economically justified if the Secretary finds that the additional cost to the consumer of purchasing a product that complies with the standard will be less than three times the value of the energy (and, as applicable, water) savings during the first year that the consumer will receive as a result of the standard, as calculated under the applicable test procedure. (42 U.S.C. 6295(o)(2)(B)(iii)) However, while this rebuttable presumption analysis applies to most commercial and industrial equipment (42 U.S.C. 6316(a)), it is not a required analysis for ASHRAE equipment (42 U.S.C. 6316(b)(1)).

EPCA also contains what is known as an "anti-backsliding" provision, which prevents the Secretary from prescribing any amended standard that either increases the maximum allowable energy use or decreases the minimum required energy efficiency of a covered product. (42 U.S.C. 6313(a)(6)(B)(iii)(I))) Also, the Secretary may not prescribe an amended or new standard if interested persons have established by a preponderance of the evidence that the standard is likely to result in the unavailability in the United States in any covered product type (or class) of performance characteristics (including reliability), features, sizes, capacities, and volumes that are substantially the same as those generally available in the United States. (42 U.S.C. 6313(a)(6)(B)(iii)(II)(aa))

B. Background

Current Standards

EPCA defines "commercial package air conditioning and heating equipment" as air-cooled, water-cooled, evaporatively-cooled, or water source (not including ground water source) electrically operated, unitary central air conditioners and central air conditioning heat pumps for commercial application. (42 U.S.C. 6311(8)(A); 10 CFR 431.92) EPCA further classifies "commercial package air conditioning and heating equipment" into categories based on cooling capacity (*i.e.*, small, large, and very large categories). (42 U.S.C. 6311(8)(B)-(D); 10 CFR 431.92) "Small commercial package air conditioning and heating equipment" means equipment rated below 135,000 Btu/h (cooling capacity). (42 U.S.C. 6311(8)(B); 10 CFR 431.92) "Large commercial package air conditioning and heating equipment" means equipment rated: (i) At or above 135,000 Btu/h; and (ii) below 240,000 Btu/h (cooling capacity). (42 U.S.C. 6311(8)(C); 10 CFR 431.92) "Very large commercial package air conditioning and heating equipment" means equipment rated: (i) At or above 240,000 Btu/h; and (ii) below 760,000 Btu/h (cooling capacity). (42 U.S.C. 6311(8)(D); 10 CFR 431.92)

Pursuant to its authority under EPCA (42 U.S.C. 6313(a)(6)(A)) and in response to updates to ASHRAE Standard 90.1, DOE has established the category of CRAC, which meets the EPCA definition of "commercial package air conditioning and heating equipment," but which EPCA did not expressly identify. *See* 10 CFR 431.92 and 431.97. Within this additional equipment category, further distinctions are made at the equipment class level based on capacity and other equipment attributes.

DOE defines "computer room air conditioner" as commercial package air-conditioning and heating equipment (packaged or split) that is: used in computer rooms, data processing rooms, or other information technology cooling applications; rated for SCOP and tested in accordance with 10 CFR 431.96, and is not a covered product under 42 U.S.C. 6291(1)-(2) and 42 U.S.C. 6292. A computer room air conditioner may be provided with, or have as available options, an integrated humidifier, temperature, and/or humidity control of the supplied air, and reheating function. 10 CFR 431.92.

In a final rule published on May 16, 2012 ("May 2012 final rule"), DOE established energy conservation standards for CRACs. Compliance with standards was required for units manufactured (1) on and after October 29, 2012, for equipment classes with NSCC less than 65,000 Btu/h and (2) on or after October 29, 2013, for equipment classes with NSCC greater than or equal to 65,000 Btu/h and less than 760,000 Btu/h. 77 FR 28929, 28995. These standards are set forth in DOE's regulations at 10 CFR 431.97 and are repeated in Table II-1.

Table II-1: Current Federal Energy Conservation Standards

Equipment type	Net sensible cooling capacity	Minimum SCOP Efficiency	
		Downflow	**Upflow**
Air-Cooled	<65,000 Btu/h	2.20	2.09
	≥65,000 Btu/h and <240,000 Btu/h	2.10	1.99
	≥240,000 Btu/h and <760,000 Btu/h	1.90	1.79
Water-Cooled	<65,000 Btu/h	2.60	2.49
	≥65,000 Btu/h and <240,000 Btu/h	2.50	2.39
	≥240,000 Btu/h and <760,000 Btu/h	2.40	2.29
Water-Cooled with a Fluid Economizer	<65,000 Btu/h	2.55	2.44
	≥65,000 Btu/h and <240,000 Btu/h	2.45	2.34
	≥240,000 Btu/h and <760,000 Btu/h	2.35	2.24
Glycol-Cooled	<65,000 Btu/h	2.50	2.39
	≥65,000 Btu/h and <240,000 Btu/h	2.15	2.04
	≥240,000 Btu/h and <760,000 Btu/h	2.10	1.99
Glycol-Cooled with a Fluid Economizer	<65,000 Btu/h	2.45	2.34
	≥65,000 Btu/h and <240,000 Btu/h	2.10	1.99
	≥240,000 Btu/h and <760,000 Btu/h	2.05	1.94

DOE's current equipment classes for CRACs are differentiated by condenser heat rejection medium (air-cooled, water-cooled, water-cooled with fluid economizer, glycol-cooled, or glycol-cooled with fluid economizer), NSCC (less than 65,000 Btu/h, greater than or equal to 65,000 Btu/h and less than 240,000 Btu/h, or greater than or equal to

240,000 Btu/h and less than 760,000 Btu/h), and direction of conditioned air over the cooling coil (upflow or downflow). 10 CFR 431.97.

DOE's test procedure for CRACs, set forth at 10 CFR 431.96, currently incorporates by reference ANSI/ASHRAE Standard 127-2007 (omit section 5.11), with additional provisions indicated in 10 CFR 431.96(c) and (e). The energy efficiency metric is SCOP for all CRAC equipment classes.

2. History of Standards Rulemaking for CRACs

As discussed, the energy conservation standards for CRACs were most recently amended in the May 2012 final rule. 77 FR 28928. The May 2012 final rule established equipment classes for CRACs and adopted energy conservation standards that correspond to the levels in the 2010 revision of ASHRAE Standard 90.1 (ASHRAE Standard 90.1-2010).

ASHRAE released the 2016 version of ASHRAE Standard 90.1 (ASHRAE Standard 90.1-2016) on October 26, 2016, which updated its test procedure reference for CRACs from ANSI/ASHRAE 127-2007 to AHRI Standard 1360-2016, "Performance Rating of Computer and Data Processing Room Air Conditioners" (AHRI 1360-2016), which in turn references ANSI/ASHRAE 127-2012, "Method of Testing for Rating Computer and Data Processing Room Unitary Air Conditioners" (ANSI/ASHRAE 127-2012). The energy efficiency metric for CRACs in AHRI 1360-2016 is NSenCOP. ASHRAE Standard 90.1-2016 established new equipment classes and added efficiency levels for horizontal-flow CRACs, disaggregated the upflow CRAC equipment classes into upflow ducted and upflow non-ducted equipment classes, and established different sets of efficiency levels for upflow ducted and upflow non-ducted equipment classes based on the corresponding rating conditions specified in AHRI 1360-2016.

DOE published a notice of data availability and request for information (NODA/RFI) in response to the amendments to the industry consensus standard contained in ASHRAE Standard 90.1-2016 in the *Federal Register* on September 11, 2019 (September 2019 NODA/RFI). 84 FR 48006. In the September 2019 NODA/RFI, DOE explained its methodology and assumptions to compare the current Federal standards for CRACs (in terms of SCOP) to the levels in ASHRAE Standard 90.1-2016 (in terms of NSenCOP) and requested comment on its methodology and results. 84 FR 48006, 48014-48019. DOE received a number of comments from interested parties in response to the September 2019 NODA/RFI.

On October 24, 2019, ASHRAE officially released for distribution and made public ASHRAE Standard 90.1-2019. ASHRAE Standard 90.1-2019 updated its test procedure reference for CRACs from AHRI 1360-2016 to AHRI 1360-2017, which also references ANSI/ASHRAE 127-2012. ASHRAE Standard 90.1-2019 maintained the equipment class structure for floor-mounted CRACs as established in ASHRAE Standard 90.1-2016, and updated the efficiency levels in ASHRAE Standard 90.1-2016 for all but three of those equipment classes. ASHRAE Standard 90.1-2019 also added classes for air-cooled CRACs with fluid economizers and a new table with new efficiency levels for ceiling-mounted CRAC equipment classes. The equipment in the horizontal-flow and ceiling-mounted classes is currently not subject to Federal standards set forth in 10 CFR 431.97.[9] In contrast, upflow and downflow air-cooled CRACs with fluid economizers

[9] DOE issued a draft guidance document on October 7, 2015 to clarify that horizontal-flow and ceiling-mounted CRACs are covered equipment and are required to be tested under the current DOE test procedure for purposes of making representations of energy consumption. (Docket No. EERE-2014-BT-GUID-0022, No. 3, pp. 1-2)

are currently subject to the Federal standards in 10 CFR 431.97 for air-cooled equipment classes.

DOE also published a NODA/RFI in response to the amendments in ASHRAE Standard 90.1-2019 and the comments received in response to the September 2019 NODA/RFI, in the *Federal Register* on September 25, 2020 (September 2020 NODA/RFI). 85 FR 60642. In the September 2020 NODA/RFI, DOE conducted a crosswalk analysis (similar to the September 2019 NODA/RFI) to compare the current Federal standards for CRACs (in terms of SCOP) to the levels in ASHRAE Standard 90.1-2019 (in terms of NSenCOP) and requested comment on its methodology and results. 85 FR 60642, 60653-60660. DOE received comments in response to the September 2020 NODA/RFI from the interested parties listed in Table II-2 of this NOPR regarding CRACs, the subject of this proposed rulemaking.

Table II-2: September 2020 NODA/RFI Written Comments

Commenter(s)	**Reference in this NOPR**	**Commenter Type**
Appliance Standards Awareness Project, Natural Resources Defense Council, Northwest Energy Efficiency Alliance	Joint Commenters	Efficiency Organizations
Air-Conditioning, Heating, and Refrigeration Institute	AHRI	Trade Association
California Investor Owned Utilities	CA IOUs	Utilities
Rheem	Rheem	Manufacturer
Trane	Trane	Manufacturer

A parenthetical reference at the end of a comment quotation or paraphrase provides the location of the item in the public record for the September 2020 NODA/RFI docket.[10] For cases in which this NOPR references comments received in response to the September 2019 NODA/RFI (which are contained within a different docket), the full docket number (rather than just the document number) is included in the parenthetical reference.

Additionally, on February 6, 2022, DOE published a test procedure NOPR (February 2022 CRAC TP NOPR), in which DOE proposed an amended test procedure for CRACs that incorporates by reference the substance of the draft version of the latest AHRI 1360 standard, AHRI Standard 1360-202X, *Performance Rating of Computer and Data Processing Room Air Conditioners* (AHRI 1360-202X Draft) and adopts NSenCOP as the test metric for CRACs. 87 FR 6948. AHRI Standard 1360-202X Draft is in draft form and its text was provided to the Department for the purposes of review only during the drafting of the February 2022 CRAC TP NOPR. As stated in the February 2022 CRAC TP NOPR, DOE intends to update the reference to the final published version of AHRI 1360-202X Draft in the test procedure final rule, unless there are substantive changes between the draft and published versions, in which case DOE may adopt the substance of the AHRI 1360-202X Draft or provide additional opportunity for comment. 87 FR 6948, 6951.

III. Discussion of Changes in ASHRAE Standard 90.1-2019

A. General

As mentioned, DOE presented an efficiency crosswalk analysis in the September 2020 NODA/RFI to compare the stringency of the current Federal standards (represented

---

[10] The parenthetical reference provides a reference for information located in the docket of DOE's rulemaking to develop energy conservation standards for CRACs. (Docket No. EERE-2020-BT-STD-0008, which is maintained at *www.regulations.gov*). The references are arranged as follows: (commenter name, comment docket ID number, page of that document).

in terms of SCOP based on the current DOE test procedure) for CRACs to the stringency of the efficiency levels for this equipment in ASHRAE Standard 90.1-2019 (represented in terms of NSenCOP and based on AHRI 1360-2017). 85 FR 60642, 60648 (Sept. 25, 2020). And in the February 2022 CRAC TP NOPR DOE proposed to incorporate by reference the latest draft version of AHRI Standard 1360, AHRI 1360-202X Draft, and adopt NSenCOP as the test metric in the DOE test procedure for CRACs. 87 FR 6948. Because the rating conditions specified in AHRI 1360-2017 and AHRI 1360-202X Draft are the same for the classes covered by DOE's crosswalk analysis (upflow ducted, upflow non-ducted, and downflow), the same crosswalk as described in the September 2020 NODA/RFI can be used to compare DOE's current SCOP-based CRAC standards to relevant NSenCOP values determined according to AHRI 1360-202X Draft.

In the September 2020 NODA/RFI, DOE's analysis focused on whether DOE had been triggered by ASHRAE Standard 90.1-2019 updates to minimum efficiency levels for CRACs and whether more-stringent standards were warranted. As discussed in detail in section III.C of this NOPR, DOE conducted a crosswalk analysis of the ASHRAE Standard 90.1-2019 standard levels (in terms of NSenCOP) and the corresponding current Federal energy conservation standards (in terms of SCOP) to compare the stringencies. 85 FR 60642, 60653-60658. DOE has tentatively determined that the updates in ASHRAE Standard 90.1-2019 increased the stringency of efficiency levels for 48 equipment classes and maintained equivalent levels for 6 equipment classes of CRACs relative to the current Federal standard. 85 FR 60642, 60658-60660. In addition, ASHRAE Standard 90.1–2019 includes efficiency levels for 18 classes of horizontal-flow CRACs and 48 classes of ceiling-mounted CRACs which are not currently subject to Federal standards and therefore require no crosswalk. As discussed in section V of this

NOPR, DOE is proposing to adopt standards for horizontal-flow CRACs and ceiling-mounted CRACs.

Table III-1 show the equipment classes and efficiency levels for CRACs provided in ASHRAE Standard 90.1-2019 alongside the current Federal energy conservation standards. Table III-1 also displays the corresponding existing Federal equipment classes for clarity and indicates whether the updated levels in ASHRAE Standard 90.1-2019 trigger DOE's evaluation pursuant to 42 U.S.C. 6313(a)(6)(A) (*i.e.,* whether the update results in a standard level more stringent than the current Federal level). The remainder of this section explains DOE's methodology for evaluating the updated levels in ASHRAE Standard 90.1-2019 and addresses comments received regarding CRAC efficiency levels and associated analyses discussed in the September 2020 NODA/RFI.

Table III-1: Energy Efficiency Levels for CRACs in ASHRAE Standard 90.1-2019 and the Corresponding Federal Energy Conservation Standards

ASHRAE Standard 90.1-2019 Equipment Class[1]	Current Federal Equipment Class[1]	Energy Efficiency Levels in ASHRAE Standard 90.1-2019[2]	Federal Energy Conservation Standards[2]	DOE Triggered by ASHRAE Standard 90.1-2019 Amendment?
Air-Cooled, <80,000 Btu/h, Downflow	Air-Cooled, <65,000 Btu/h, Downflow	2.70 NSenCOP	2.20 SCOP	Yes
Air-Cooled, <65,000 Btu/h, Horizontal-flow	N/A	2.65 NSenCOP	N/A	Yes[3]
Air-Cooled, <80,000 Btu/h, Upflow Ducted	Air-Cooled, <65,000 Btu/h, Upflow	2.67 NSenCOP	2.09 SCOP	Yes
Air-Cooled, <65,000 Btu/h, Upflow Non-Ducted	Air-Cooled, <65,000 Btu/h, Upflow	2.16 NSenCOP	2.09 SCOP	Yes
Air-Cooled, ≥80,000 and <295,000 Btu/h, Downflow	Air-Cooled, ≥65,000 and <240,000 Btu/h, Downflow	2.58 NSenCOP	2.10 SCOP	Yes
Air-Cooled, ≥65,000 and <240,000 Btu/h, Horizontal-flow	N/A	2.55 NSenCOP	N/A	Yes[3]

Air-Cooled, ≥80,000 and <295,000 Btu/h, Upflow Ducted	Air-Cooled, ≥65,000 and <240,000 Btu/h, Upflow	2.55 NSenCOP	1.99 SCOP	No[4]
Air-Cooled, ≥65,000 and <240,000 Btu/h, Upflow Non-Ducted	Air-Cooled, ≥65,000 and <240,000 Btu/h, Upflow	2.04 NSenCOP	1.99 SCOP	Yes
Air-Cooled, ≥295,000 Btu/h, Downflow	Air-Cooled, ≥240,000 Btu/h and <760,000 Btu/h, Downflow	2.36 NSenCOP	1.90 SCOP	Yes
Air-Cooled, ≥240,000 Btu/h, Horizontal-flow	N/A	2.47 NSenCOP	N/A	Yes[3]
Air-Cooled, ≥295,000 Btu/h, Upflow Ducted	Air-Cooled, ≥240,000 Btu/h and <760,000 Btu/h, Upflow	2.33 NSenCOP	1.79 SCOP	Yes
Air-Cooled, ≥240,000 Btu/h, Upflow Non-ducted	Air-Cooled, ≥240,000 Btu/h and <760,000 Btu/h, Upflow	1.89 NSenCOP	1.79 SCOP	Yes
Air-Cooled with fluid economizer, <80,000 Btu/h, Downflow	Air-Cooled, <65,000 Btu/h, Downflow	2.70 NSenCOP	2.20 SCOP	Yes[5]
Air-Cooled with fluid economizer, <65,000 Btu/h, Horizontal-flow	N/A	2.65 NSenCOP	N/A	Yes[3]
Air-Cooled with fluid economizer, <80,000 Btu/h, Upflow Ducted	Air-Cooled, <65,000 Btu/h, Upflow	2.67 NSenCOP	2.09 SCOP	Yes[5]
Air-Cooled with fluid economizer, <65,000 Btu/h, Upflow Non-Ducted	Air-Cooled, <65,000 Btu/h, Upflow	2.09 NSenCOP	2.09 SCOP	No[4]
Air-Cooled with fluid economizer, ≥80,000 and <295,000 Btu/h, Downflow	Air-Cooled, ≥65,000 and <240,000 Btu/h, Downflow	2.58 NSenCOP	2.10 SCOP	Yes[5]
Air-Cooled with fluid economizer, ≥65,000 and <240,000 Btu/h, Horizontal-flow	N/A	2.55 NSenCOP	N/A	Yes[3]
Air-Cooled with fluid economizer, ≥80,000 and <295,000 Btu/h, Upflow Ducted	Air-Cooled, ≥65,000 and <240,000 Btu/h, Upflow	2.55 NSenCOP	1.99 SCOP	No[4]
Air-Cooled with fluid economizer, ≥65,000 and <240,000 Btu/h, Upflow Non-Ducted	Air-Cooled, ≥65,000 and <240,000 Btu/h, Upflow	1.99 NSenCOP	1.99 SCOP	No[4]
Air-Cooled with fluid economizer, ≥295,000 Btu/h, Downflow	Air-Cooled, ≥240,000 Btu/h and <760,000 Btu/h, Downflow	2.36 NSenCOP	1.90 SCOP	Yes[5]
Air-Cooled with fluid economizer, ≥240,000 Btu/h, Horizontal-flow	N/A	2.47 NSenCOP	N/A	Yes[3]
Air-Cooled with fluid economizer, ≥295,000 Btu/h, Upflow Ducted	Air-Cooled, ≥240,000 Btu/h and <760,000 Btu/h, Upflow	2.33 NSenCOP	1.79 SCOP	Yes[5]
Air-Cooled with fluid economizer, ≥240,000 Btu/h, Upflow Non-ducted	Air-Cooled, ≥240,000 Btu/h and <760,000 Btu/h, Upflow	1.81 NSenCOP	1.79 SCOP	Yes[5]
Water-Cooled, <80,000 Btu/h, Downflow	Water-Cooled, <65,000 Btu/h, Downflow	2.82 NSenCOP	2.60 SCOP	Yes

Water-Cooled, <65,000 Btu/h, Horizontal-flow	N/A	2.79 NSenCOP	N/A	Yes[3]
Water-Cooled, <80,000 Btu/h, Upflow Ducted	Water-Cooled, <65,000 Btu/h, Upflow	2.79 NSenCOP	2.49 SCOP	Yes
Water-Cooled, <65,000 Btu/h, Upflow Non-ducted	Water-Cooled, <65,000 Btu/h, Upflow	2.43 NSenCOP	2.49 SCOP	Yes
Water-Cooled, ≥80,000 and <295,000 Btu/h, Downflow	Water-Cooled, ≥65,000 and <240,000 Btu/h, Downflow	2.73 NSenCOP	2.50 SCOP	Yes
Water-Cooled, ≥65,000 and <240,000 Btu/h, Horizontal-flow	N/A	2.68 NSenCOP	N/A	Yes[3]
Water-Cooled, ≥80,000 and <295,000 Btu/h, Upflow Ducted	Water-Cooled, ≥65,000 and <240,000 Btu/h, Upflow	2.70 NSenCOP	2.39 SCOP	No[4]
Water-Cooled, ≥65,000 and <240,000 Btu/h, Upflow Non-ducted	Water-Cooled, ≥65,000 and <240,000 Btu/h, Upflow	2.32 NSenCOP	2.39 SCOP	Yes
Water-Cooled, ≥295,000 Btu/h, Downflow	Water-Cooled, ≥240,000 Btu/h and <760,000 Btu/h, Downflow	2.67 NSenCOP	2.40 SCOP	Yes
Water-Cooled, ≥240,000 Btu/h, Horizontal-flow	N/A	2.60 NSenCOP	N/A	Yes[3]
Water-Cooled, ≥295,000 Btu/h, Upflow Ducted	Water-Cooled, ≥240,000 Btu/h and <760,000 Btu/h, Upflow	2.64 NSenCOP	2.29 SCOP	Yes
Water-Cooled, ≥240,000 Btu/h, Upflow Non-ducted	Water-Cooled, ≥240,000 Btu/h and <760,000 Btu/h, Upflow	2.20 NSenCOP	2.29 SCOP	Yes
Water-Cooled with fluid economizer, <80,000 Btu/h, Downflow	Water-Cooled with fluid economizer, <65,000 Btu/h, Downflow	2.77 NSenCOP	2.55 SCOP	Yes
Water-Cooled with fluid economizer, <65,000 Btu/h, Horizontal-flow	N/A	2.71 NSenCOP	N/A	Yes[3]
Water-Cooled with fluid economizer, <80,000 Btu/h, Upflow Ducted	Water-Cooled with fluid economizer, <65,000 Btu/h, Upflow	2.74 NSenCOP	2.44 SCOP	Yes
Water-Cooled with fluid economizer, <65,000 Btu/h, Upflow Non-ducted	Water-Cooled with fluid economizer, <65,000 Btu/h, Upflow	2.35 NSenCOP	2.44 SCOP	Yes
Water-Cooled with fluid economizer, ≥80,000 and <295,000 Btu/h, Downflow	Water-Cooled with fluid economizer, ≥65,000 and <240,000 Btu/h, Downflow	2.68 NSenCOP	2.45 SCOP	Yes
Water-Cooled with fluid economizer, ≥65,000 and <240,000 Btu/h, Horizontal-flow	N/A	2.60 NSenCOP	N/A	Yes[3]
Water-Cooled with fluid economizer, ≥80,000 and	Water-Cooled with fluid economizer,	2.65 NSenCOP	2.34 SCOP	No[4]

<295,000 Btu/h, Upflow Ducted	≥65,000 and <240,000 Btu/h, Upflow			
Water-Cooled with fluid economizer, ≥65,000 and <240,000 Btu/h, Upflow Non-ducted	Water-Cooled with fluid economizer, ≥65,000 and <240,000 Btu/h, Upflow	2.24 NSenCOP	2.34 SCOP	Yes
Water-Cooled with fluid economizer, ≥295,000 Btu/h, Downflow	Water-Cooled with fluid economizer, ≥240,000 Btu/h and <760,000 Btu/h, Downflow	2.61 NSenCOP	2.35 SCOP	Yes
Water-Cooled with fluid economizer, ≥240,000 Btu/h, Horizontal-flow	N/A	2.54 NSenCOP	N/A	Yes[3]
Water-Cooled with fluid economizer, ≥295,000 Btu/h, Upflow Ducted	Water-Cooled with fluid economizer, ≥240,000 Btu/h and <760,000 Btu/h, Upflow	2.58 NSenCOP	2.24 SCOP	Yes
Water-Cooled with fluid economizer, ≥240,000 Btu/h, Upflow Non-ducted	Water-Cooled with fluid economizer, ≥240,000 Btu/h and <760,000 Btu/h, Upflow	2.12 NSenCOP	2.24 SCOP	Yes
Glycol-Cooled, <80,000 Btu/h, Downflow	Glycol-Cooled, <65,000 Btu/h, Downflow	2.56 NSenCOP	2.50 SCOP	Yes
Glycol-Cooled, <65,000 Btu/h, Horizontal-flow	N/A	2.48 NSenCOP	N/A	Yes[3]
Glycol-Cooled, <80,000 Btu/h, Upflow Ducted	Glycol-Cooled, <65,000 Btu/h, Upflow Ducted	2.53 NSenCOP	2.39 SCOP	Yes
Glycol-Cooled, <65,000 Btu/h, Upflow Non-ducted	Glycol-Cooled, <65,000 Btu/h, Upflow Non-ducted	2.08 NSenCOP	2.39 SCOP	Yes
Glycol-Cooled, ≥80,000 and <295,000 Btu/h, Downflow	Glycol-Cooled, ≥65,000 and <240,000 Btu/h, Downflow	2.24 NSenCOP	2.15 SCOP	Yes
Glycol-Cooled, ≥65,000 and <240,000 Btu/h, Horizontal-flow	N/A	2.18 NSenCOP	N/A	Yes[3]
Glycol-Cooled, ≥80,000 and <295,000 Btu/h, Upflow Ducted	Glycol-Cooled, ≥65,000 and <240,000 Btu/h, Upflow	2.21 NSenCOP	2.04 SCOP	Yes
Glycol-Cooled, ≥65,000 and <240,000 Btu/h, Upflow Non-ducted	Glycol-Cooled, ≥65,000 and <240,000 Btu/h, Upflow	1.90 NSenCOP	2.04 SCOP	Yes
Glycol-Cooled, ≥295,000 Btu/h, Downflow	Glycol-Cooled, ≥240,000 Btu/h and <760,000 Btu/h, Downflow	2.21 NSenCOP	2.10 SCOP	Yes
Glycol-Cooled, ≥240,000 Btu/h, Horizontal-flow	N/A	2.18 NSenCOP	N/A	Yes[3]
Glycol-Cooled, ≥295,000 Btu/h, Upflow Ducted	Glycol-Cooled, ≥240,000 Btu/h and <760,000 Btu/h, Upflow Ducted	2.18 NSenCOP	1.99 SCOP	Yes
Glycol-Cooled, ≥240,000 Btu/h, Upflow Non-ducted	Glycol-Cooled, ≥240,000 Btu/h and	1.81 NSenCOP	1.99 SCOP	Yes

	<760,000 Btu/h, Upflow Non-ducted			
Glycol-Cooled with fluid economizer, <80,000 Btu/h, Downflow	Glycol-Cooled with fluid economizer, <65,000 Btu/h, Downflow	2.51 NSenCOP	2.45 SCOP	Yes
Glycol-Cooled with fluid economizer, <65,000 Btu/h, Horizontal-flow	N/A	2.44 NSenCOP	N/A	Yes[3]
Glycol-Cooled with fluid economizer, <80,000 Btu/h, Upflow Ducted	Glycol-Cooled with fluid economizer, <65,000 Btu/h, Upflow Ducted	2.48 NSenCOP	2.34 SCOP	Yes
Glycol-Cooled with fluid economizer, <65,000 Btu/h, Upflow Non-ducted	Glycol-Cooled with fluid economizer, <65,000 Btu/h, Upflow Non-ducted	2.00 NSenCOP	2.34 SCOP	Yes
Glycol-Cooled with fluid economizer, ≥80,000 and <295,000 Btu/h, Downflow	Glycol-Cooled with fluid economizer, ≥65,000 and <240,000 Btu/h, Downflow	2.19 NSenCOP	2.10 SCOP	Yes
Glycol-Cooled with fluid economizer, ≥65,000 and <240,000 Btu/h, Horizontal-flow	N/A	2.10 NSenCOP	N/A	Yes[3]
Glycol-Cooled with fluid economizer, ≥80,000 and <295,000 Btu/h, Upflow Ducted	Glycol-Cooled with fluid economizer, ≥65,000 and <240,000 Btu/h, Upflow	2.16 NSenCOP	1.99 SCOP	Yes
Glycol-Cooled with fluid economizer, ≥65,000 and <240,000 Btu/h, Upflow Non-ducted	Glycol-Cooled with fluid economizer, ≥65,000 and <240,000 Btu/h, Upflow	1.82 NSenCOP	1.99 SCOP	Yes
Glycol-Cooled with fluid economizer, ≥295,000 Btu/h, Downflow	Glycol-Cooled with fluid economizer, ≥240,000 Btu/h and <760,000 Btu/h, Downflow	2.15 NSenCOP	2.05 SCOP	Yes
Glycol-Cooled with fluid economizer, ≥240,000 Btu/h, Horizontal-flow	N/A	2.10 NSenCOP	N/A	Yes[3]
Glycol-Cooled with fluid economizer, ≥295,000 Btu/h, Upflow Ducted	Glycol-Cooled with fluid economizer, ≥240,000 Btu/h and <760,000 Btu/h, Upflow Ducted	2.12 NSenCOP	1.94 SCOP	Yes
Glycol-Cooled with fluid economizer, ≥240,000 Btu/h, Upflow Non-ducted	Glycol-Cooled with fluid economizer, ≥240,000 Btu/h and <760,000 Btu/h, Upflow Non-ducted	1.73 NSenCOP	1.94 SCOP	Yes
Ceiling-mounted, Air-cooled with free air discharge condenser, Ducted, <29,000 Btu/h	N/A	2.05 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Air-cooled with free air discharge condenser, Ducted, ≥29,000 Btu/h and <65,000 Btu/h	N/A	2.02 NSenCOP	N/A	Yes[6]

Ceiling-mounted, Air-cooled with free air discharge condenser, Ducted, ≥65,000 Btu/h	N/A	1.92 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Air-cooled with free air discharge condenser, Non-ducted, <29,000 Btu/h	N/A	2.08 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Air-cooled with free air discharge condenser, Non-ducted, ≥29,000 Btu/h and <65,000 Btu/h	N/A	2.05 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Air-cooled with free air discharge condenser, Non-ducted, ≥65,000 Btu/h	N/A	1.94 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Air-cooled with free air discharge condenser with fluid economizer, Ducted, <29,000 Btu/h	N/A	2.01 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Air-cooled with free air discharge condenser with fluid economizer, Ducted, ≥29,000 Btu/h and <65,000 Btu/h	N/A	1.97 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Air-cooled with free air discharge condenser with fluid economizer, Ducted, ≥65,000 Btu/h	N/A	1.87 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Air-cooled with free air discharge condenser with fluid economizer, Non-ducted, <29,000 Btu/h	N/A	2.04 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Air-cooled with free air discharge condenser with fluid economizer, Non-ducted, ≥29,000 Btu/h and <65,000 Btu/h	N/A	2.00 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Air-cooled with free air discharge condenser with fluid economizer, Non-ducted, ≥65,000 Btu/h	N/A	1.89 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Air-cooled with ducted condenser, Ducted, <29,000 Btu/h	N/A	1.86 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Air-cooled with ducted condenser, Ducted, ≥29,000 Btu/h and <65,000 Btu/h	N/A	1.83 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Air-cooled with ducted condenser, Ducted, ≥65,000 Btu/h	N/A	1.73 NSenCOP	N/A	Yes[6]

Ceiling-mounted, Air-cooled with ducted condenser, Non-ducted, <29,000 Btu/h	N/A	1.89 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Air-cooled with ducted condenser, Non-ducted, ≥29,000 Btu/h and <65,000 Btu/h	N/A	1.86 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Air-cooled with ducted condenser, Non-ducted, ≥65,000 Btu/h	N/A	1.75 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Air-cooled with ducted condenser with fluid economizer, Ducted, <29,000 Btu/h	N/A	1.82 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Air-cooled with ducted condenser with fluid economizer, Ducted, ≥29,000 Btu/h and <65,000 Btu/h	N/A	1.78 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Air-cooled with ducted condenser with fluid economizer, Ducted, ≥65,000 Btu/h	N/A	1.68 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Air-cooled with ducted condenser with fluid economizer, Non-ducted, <29,000 Btu/h	N/A	1.85 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Air-cooled with ducted condenser with fluid economizer, Non-ducted, ≥29,000 Btu/h and <65,000 Btu/h	N/A	1.81 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Air-cooled with ducted condenser with fluid economizer, Non-ducted, ≥65,000 Btu/h	N/A	1.70 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Water-cooled, Ducted, <29,000 Btu/h	N/A	2.38 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Water-cooled, Ducted, ≥29,000 Btu/h and <65,000 Btu/h	N/A	2.28 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Water-cooled, Ducted, ≥65,000 Btu/h	N/A	2.18 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Water-cooled, Non-ducted, <29,000 Btu/h	N/A	2.41 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Water-cooled, Non-ducted, ≥29,000 Btu/h and <65,000 Btu/h	N/A	2.31 NSenCOP	N/A	Yes[6]

Ceiling-mounted, Water-cooled, Non-ducted, ≥65,000 Btu/h	N/A	2.20 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Water-cooled with fluid economizer, Ducted, <29,000 Btu/h	N/A	2.33 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Water-cooled with fluid economizer, Ducted, ≥29,000 Btu/h and <65,000 Btu/h	N/A	2.23 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Water-cooled with fluid economizer, Ducted, ≥65,000 Btu/h	N/A	2.13 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Water-cooled with fluid economizer, Non-ducted, <29,000 Btu/h	N/A	2.36 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Water-cooled with fluid economizer, Non-ducted, ≥29,000 Btu/h and <65,000 Btu/h	N/A	2.26 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Water-cooled with fluid economizer, Non-ducted, ≥65,000 Btu/h	N/A	2.16 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Glycol-cooled, Ducted, <29,000 Btu/h	N/A	1.97 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Glycol-cooled, Ducted, ≥29,000 Btu/h and <65,000 Btu/h	N/A	1.93 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Glycol-cooled, Ducted, ≥65,000 Btu/h	N/A	1.78 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Glycol-cooled, Non-ducted, <29,000 Btu/h	N/A	2.00 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Glycol-cooled, Non-ducted, ≥29,000 Btu/h and <65,000 Btu/h	N/A	1.98 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Glycol-cooled, Non-ducted, ≥65,000 Btu/h	N/A	1.81 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Glycol-cooled with fluid economizer, Ducted, <29,000 Btu/h	N/A	1.92 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Glycol-cooled with fluid economizer, Ducted, ≥29,000 Btu/h and <65,000 Btu/h	N/A	1.88 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Glycol-cooled with fluid economizer, Ducted, ≥65,000 Btu/h	N/A	1.73 NSenCOP	N/A	Yes[6]

Ceiling-mounted, Glycol-cooled with fluid economizer, Non-ducted, <29,000 Btu/h	N/A	1.95 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Glycol-cooled with fluid economizer, Non-ducted, ≥29,000 Btu/h and <65,000 Btu/h	N/A	1.93 NSenCOP	N/A	Yes[6]
Ceiling-mounted, Glycol-cooled with fluid economizer, Non-ducted, ≥65,000 Btu/h	N/A	1.76 NSenCOP	N/A	Yes[6]

[1] Note that equipment classes specified in ASHRAE Standard 90.1-2019 do not necessarily correspond to the equipment classes defined in DOE's regulations. Capacity ranges in ASHRAE Standard 90.1-2019 are specified in terms of NSCC, as measured according to AHRI 1360-2017 (which, as discussed, would produce the same results for the crosswalked classes as AHRI 1360-202X Draft). Capacity ranges in current Federal equipment classes are specified in terms of NSCC, as measured according to ANSI/ASHRAE 127-2007. As discussed in section III.C, for certain equipment classes AHRI 1360-2017 (and AHRI 1360-202X Draft) results in increased NSCC measurements as compared to the NSCC measured in accordance with ANSI/ASHRAE 127-2007. Therefore, some CRACs would switch classes (i.e., move into a higher capacity equipment class) if the equipment class boundaries are not changed accordingly. Consequently, DOE performed a "capacity crosswalk" analysis to translate the capacity boundaries for certain equipment classes.
[2] For CRACs, ASHRAE Standard 90.1-2019 adopted efficiency levels in terms of NSenCOP based on test procedures in AHRI 1360-2017, while DOE's current standards are in terms of SCOP based on the test procedures in ANSI/ASHRAE 127-2007. DOE performed a crosswalk analysis to compare the stringency of the ASHRAE Standard 90.1-2019 efficiency levels with the current Federal standards. See section III.C of this NOPR for further discussion on the crosswalk analysis performed for CRACs.
[3] Horizontal-flow CRACs are new equipment classes included in ASHRAE Standard 90.1-2016 and ASHRAE Standard 90.1-2019 (and not subject to current Federal standards), but DOE does not have any data to indicate the market share of horizontal-flow units. In the absence of data regarding market share and efficiency distribution, DOE is unable to estimate potential savings for horizontal-flow equipment classes.
[4] The crosswalk analysis indicates that there is no difference in stringency of efficiency levels for this class between ASHRAE Standard 90.1-2019 and the current Federal standard.
[5] Air-cooled CRACs with fluid economizers are new equipment classes included in ASHRAE Standard 90.1-2019 and are currently subject to the Federal standard for air-cooled CRACs. DOE does not have data regarding market share for air-cooled CRACs with fluid economizers. Although DOE is unable to disaggregate the estimated potential savings for these equipment classes, energy savings for these equipment classes are included in the savings presented for air-cooled CRACs.
[6] Ceiling-mounted CRACs are new equipment classes in ASHRAE Standard 90.1-2019 (and not subject to current Federal standards), and DOE does not have any data to indicate the market share of ceiling-mounted units. In the absence of data regarding market share and efficiency distribution, DOE is unable to estimate potential savings for ceiling-mounted equipment classes.

B. Test Procedure

As noted in section III.A of this document, ASHRAE adopted efficiency levels for all CRAC equipment classes denominated in terms of NSenCOP in ASHRAE Standard 90.1-2019 (measured per AHRI 1360-2017) whereas DOE's current standards are denominated in terms of SCOP (measured per ANSI/ASHRAE 127-2007). ASHRAE

Standard 90.1-2019 incorporates by references AHRI 1360-2017. In the February 2022 CRAC TP NOPR, DOE proposed to adopt an amended test procedure for CRACs that incorporates by reference the substance of the updated draft version of the AHRI 1360 Standard, AHRI 1360-202X Draft. 87 FR 6948. Because the rating conditions specified in AHRI 1360-202X Draft and AHRI 1360-2017 are the same for the classes for which DOE requires a crosswalk (upflow ducted, upflow non-ducted, and downflow), DOE has tentatively concluded that the NSenCOP levels specified for equipment classes in ASHRAE Standard 90.1-2019 as measured per AHRI 1360-2017 would remain unchanged if measured per AHRI 1360-202X Draft. Therefore, in the crosswalk analysis presented in the following sections, DOE considers that the ASHRAE Standard 90.1-2019 NSenCOP levels are measured per AHRI 1360-202X Draft.

C. Methodology for Efficiency and Capacity Crosswalk Analyses

For the efficiency crosswalk, DOE analyzed the CRAC equipment classes in ASHRAE Standard 90.1-2019 that are currently subject to Federal standards (*i.e.*, all upflow and downflow classes).[11] As discussed in the subsequent paragraphs, for certain CRAC classes, ASHRAE Standard 90.1-2019 specifies classes that disaggregate the current Federal equipment classes into additional classes.

For upflow CRACs, ASHRAE Standard 90.1-2019 includes separate sets of efficiency levels for ducted and non-ducted units. This reflects the differences in rating conditions for upflow ducted and upflow non-ducted units in AHRI 1360-202X Draft (*e.g.*, return air temperature and external static pressure (ESP). The current Federal test procedure does not specify different rating conditions for upflow ducted as compared to

[11] ASHRAE Standard 90.1-2019 includes efficiency levels for horizontal-flow and ceiling-mounted classes of CRACs. DOE does not currently prescribe standards for horizontal-flow or ceiling-mounted classes, so these classes were not included in the crosswalk analysis.

upflow non-ducted CRACs, and DOE's current standards set forth in 10 CFR 431.97 also do not differentiate between upflow ducted and upflow non-ducted CRACs. For the purpose of the efficiency crosswalk analysis, DOE converted the single set of current Federal SCOP standards, which encompasses all upflow CRACs, to two sets of "crosswalked" NSenCOP levels for both the upflow ducted and upflow non-ducted classes present in ASHRAE Standard 90.1-2019.

Similarly, for air-cooled CRACs, ASHRAE Standard 90.1-2019 includes separate sets of efficiency levels for equipment with and without fluid economizers. Specifically, ASHRAE Standard 90.1-2019 specifies less stringent efficiency levels for equipment with fluid economizers, reflecting the additional pressure drop in the indoor air stream from the presence of the fluid economizer that the indoor fan must overcome. DOE's current standards set forth in 10 CFR 431.97 do not distinguish air-cooled CRACs based on the presence of fluid economizers. Therefore, DOE's crosswalk analysis converted the single set of current Federal standards for air-cooled classes (in terms of SCOP) to two sets of standards in terms of NSenCOP for air-cooled classes distinguishing CRACs with and without fluid economizers. However, there is no difference between the rating conditions in AHRI 1360-202X Draft for air-cooled CRACs with and without fluid economizers, so the results of the crosswalk analysis converting the current standards to NSenCOP standards are identical for these classes.

As explained previously, the efficiency levels for CRACs in ASHRAE Standard 90.1-2019 rely on a different metric (NSenCOP) and test procedure (AHRI 1360-2017, and now by extension AHRI 1360-202X Draft) than the metric and test procedure required under the current Federal standards (relying on SCOP and ANSI/ASHRAE 127-2007, respectively). AHRI 1360-202X Draft and ANSI/ASHRAE 127-2007 notably also specify different rating conditions. These differences are listed in Table III-2, and are discussed in detail in sections III.C.1 through III.C.4 of this document.

Table III-2: Differences in Rating Conditions Between DOE's Current Test Procedure and AHRI Standard 1360-202X Draft

<table>
<tr><th>Test Parameter</th><th>Affected Equipment Categories</th><th colspan="2">Current DOE Test Procedure (ANSI/ASHRAE 127-2007)</th><th colspan="2">AHRI 1360-202X Draft</th></tr>
<tr><td>Return air dry-bulb temperature (RAT)</td><td>Upflow ducted and downflow</td><td colspan="2">75 °F dry-bulb temperature</td><td colspan="2">85 °F dry-bulb temperature</td></tr>
<tr><td>Entering water temperature (EWT)</td><td>Water-cooled</td><td colspan="2">86 °F</td><td colspan="2">83 °F</td></tr>
<tr><td rowspan="3">ESP (varies with NSCC)</td><td rowspan="3">Upflow ducted</td><td><20 kW</td><td>0.8 in H_2O</td><td><80 kBtu/h</td><td>0.3 in H_2O</td></tr>
<tr><td rowspan="2">≥20 kW</td><td rowspan="2">1.0 in H_2O</td><td>≥80 kBtu/h and <295 kBtu/h</td><td>0.4 in H_2O</td></tr>
<tr><td>≥295 kBtu/h and <760 kBtu/h</td><td>0.5 in H_2O</td></tr>
<tr><td>Adder for heat rejection fan and pump power (add to total power consumption)</td><td>Water-cooled and glycol-cooled</td><td colspan="2">No added power consumption for heat rejection fan and pump</td><td colspan="2">5 percent of NSCC for water-cooled CRACs

7.5 percent of NSCC for glycol-cooled CRACs</td></tr>
</table>

The differences between these specified rating conditions in AHRI 1360-202X Draft compared to ANSI/ASHRAE 127-2007 impacts the capacity boundaries for CRAC equipment classes. The capacity values that bound the CRAC equipment classes in ASHRAE Standard 90.1-2019 and in DOE's current standards at 10 CFR 431.97 are in terms of NSCC. In ASHRAE Standard 90.1-2019, the capacity boundaries for downflow and upflow-ducted CRAC equipment classes are increased relative to the boundaries of the analogous classes in the current Federal standards. For certain equipment classes, NSCC values determined according to AHRI 1360-202X Draft's different rating conditions are higher than the NSCC values determined according to ANSI/ASHRAE 127-2007. Therefore, the test conditions in AHRI 1360-202X Draft result in an increased NSCC value for certain equipment classes, as compared to the NSCC measured in accordance with the current Federal test procedure requirement. This means that some CRACs would switch classes (*i.e.*, move into a higher capacity equipment class) if the test conditions in AHRI 1360-202X Draft are used without shifting current equipment class boundaries to match the impact of the changes in rating conditions.

The stringency of both the ASHRAE Standard 90.1 efficiency level and the current Federal standard decreases as the equipment class capacity increases for upflow and downflow CRAC classes. Therefore, class switching would subject some CRAC models to an efficiency level under ASHRAE Standard 90.1-2019 that is less stringent than the standard level that is applicable to that model under the current Federal requirements. Lowering the stringency of the efficiency level in the Federal requirements is impermissible under EPCA's anti-backsliding provision at 42 U.S.C. 6313(a)(6)(B)(iii)(I).

To evaluate the capacity boundaries under ASHRAE Standard 90.1-2019 and allow for an appropriate comparison between current Federal efficiency standards and the efficiency levels in ASHRAE Standard 90.1-2019 and to avoid potential backsliding, a capacity crosswalk was conducted to translate the NSCC boundaries that separate equipment classes in the Federal efficiency standards to account for the expected increase in measured NSCC values for affected equipment classes (*i.e.*, equipment classes with test procedure changes that increase NSCC). DOE's capacity crosswalk calculated the increases in the capacity boundaries of affected equipment classes from the Federal efficiency standards if ASHRAE Standard 90.1-2019 were adopted, to evaluate this equipment class switching issue and to avoid backsliding that would occur from class switching if capacity boundaries did not account for the changed rating conditions in ASHRAE Standard 90.1-2019.

Both the efficiency and capacity crosswalk analyses have a similar structure and the data for both analyses came from several of the same sources. The crosswalk analyses were informed by numerous sources, including public manufacturer literature, manufacturer performance data obtained through non-disclosure agreements (NDAs), results from DOE's testing of two CRAC units, and DOE's Compliance Certification Database[12] for CRACs. DOE analyzed each test procedure change (e.g., change in rating conditions) independently, and used the available data to determine an aggregated percentage by which that change impacted efficiency (SCOP) and/or NSCC. Updated SCOP levels and NSCC equipment class boundaries were calculated for each class (as applicable) by combining the percentage changes for every test procedure change applicable to that class.

The following sub-sections describe the approaches used to analyze the impacts on the measured efficiency and capacity of each difference in rating conditions between DOE's current test procedure and AHRI 1360-202X Draft. As discussed, the crosswalk analysis methodology described in the following sub-sections is the same as presented in the September 2020 NODA/RFI. No additional data sources were added to the analysis for this NOPR.

1. Increase in Return Air Dry-Bulb Temperature from 75 °F to 85 °F

ANSI/ASHRAE 127-2007, which is referenced by DOE's current test procedure, specifies a return air dry-bulb temperature (RAT) of 75 °F for testing all CRACs. AHRI 1360-202X Draft specifies a RAT of 85 °F for upflow ducted and downflow CRACs, but specifies an RAT for upflow non-ducted units of 75 °F.

[12] DOE's Compliance Certification Database is available at: *www.regulations.doe.gov/ccms*

SCOP and NSCC both increase with increasing RAT for two reasons. First, a higher RAT increases the cooling that must be done for the air to approach its dew point temperature (*i.e.*, the temperature at which water vapor will condense if there is any additional cooling). Second, a higher RAT will tend to raise the evaporating temperature of the refrigerant, which in turn raises the temperature of fin and tube surfaces in contact with the air—the resulting reduction in the portion of the heat exchanger surface that is below the air's dew point temperature reduces the potential for water vapor to condense on these surfaces. This is seen in product specifications which show that the sensible heat ratio[13] is consistently higher at a RAT of 85 °F than at 75 °F. Because increasing RAT increases the fraction of total cooling capacity that is sensible cooling (rather than latent cooling), the NSCC increases. Further, because SCOP is calculated with NSCC in the numerator of the calculation, an increase in NSCC also inherently increases SCOP.

To analyze the magnitude of the impacts of increasing RAT for upflow ducted and downflow CRACs on SCOP and NSCC, DOE gathered data from three separate sources and aggregated the results for each crosswalk analysis. First, DOE used product specifications for several CRAC models that provide SCOP and NSCC ratings for RATs ranging from 75 °F to 95 °F. Second, DOE analyzed manufacturer performance data obtained under NDAs that showed the performance impact of individual test condition changes, including the increase in RAT. Third, DOE used results from testing two CRAC units: one air-cooled upflow ducted and one air-cooled downflow unit. DOE combined the results of these sources to find the aggregated increases in SCOP and NSCC due to the increase in RAT. The increase in SCOP due to the change in RAT was

[13] "Sensible heat ratio" is the ratio of sensible cooling capacity to the total cooling capacity. The total cooling capacity includes both sensible cooling capacity (cooling associated with reduction in temperature) and latent cooling capacity (cooling associated with dehumidification).

found to be approximately 19 percent, and the increase in NSCC was found to be approximately 22 percent.

2. Decrease in Entering Water Temperature for Water-Cooled CRACs

ANSI/ASHRAE 127-2007, which is referenced by DOE's current test procedure, specifies an entering water temperature (EWT) of 86 °F for water-cooled CRACs, while AHRI 1360-202X Draft specifies an entering water temperature of 83 °F. A decrease in the EWT for water-cooled CRACs increases the temperature difference between the water and hot refrigerant in the condenser coil, thus increasing cooling capacity and decreasing compressor power. To analyze the impact of this decrease in EWT on SCOP and NSCC, DOE analyzed manufacturer data obtained through NDAs and a publicly-available presentation from a major CRAC manufacturer and calculated a SCOP increase of approximately 2 percent and an NSCC increase of approximately 1 percent.

3. Changes in External Static Pressure Requirements for Upflow Ducted CRACs

For upflow ducted CRACs, AHRI 1360-202X Draft specifies lower ESP requirements than ANSI/ASHRAE 127-2007, which is referenced in DOE's current test procedure. The ESP requirements in all CRAC industry test standards vary with NSCC; however, the capacity bins (*i.e.*, capacity ranges over which each ESP requirement applies) in ANSI/ASHRAE 127-2007 are different from those in AHRI 1360-202X Draft. Testing with a lower ESP decreases the indoor fan power input without a corresponding decrease in NSCC, thus increasing the measured SCOP. Additionally, the reduction in fan heat entering the indoor air stream that results from lower fan power also slightly increases NSCC, further increasing SCOP.

To analyze the impacts on measured SCOP and NSCC of the changes in ESP requirements between DOE's current test procedure and AHRI 1360-202X Draft, DOE aggregated data from its analysis of fan power consumption changes, manufacturer data obtained through NDAs, and results from DOE testing. Notably, the impact of changes in ESP requirements on SCOP and NSCC was calculated separately in DOE's analysis for each capacity range specified in AHRI 1360-202X Draft (*i.e.*, < 80 kBtu/h, 80-295 kBtu/h, and ≥ 295 kBtu/h). As discussed in III.C of this document, NSCC values determined according to ANSI/ASHRAE 127-2007 are lower than NSCC values determined according to AHRI 1360-202X Draft for certain CRAC classes, including upflow-ducted classes. The increase in NSCC in AHRI 1360-202X Draft also impacts the ESP requirements in AHRI 1360-202X Draft for upflow-ducted units, because the ESP requirements are specified based on NSCC. Different ESP requirements impact the stringency of the test – as discussed, testing with a lower ESP increases the measured SCOP. AHRI 1360-202X Draft addresses this issue by updating the NSCC capacity bin boundaries associated with the applicable ESP. For the purposes of the efficiency and capacity crosswalk analyses in this NOPR, DOE used the adjusted capacity boundaries in AHRI 1360-202X Draft for upflow ducted classes presented in Table III-4 (as discussed in section III.C.5 of this document) to specify the applicable ESP requirement.

DOE conducted an analysis to estimate the change in fan power consumption due to the changes in ESP requirements using performance data and product specifications for 77 upflow CRAC models with certified SCOP ratings at or near the current applicable SCOP standard level in DOE's Compliance Certification Database. Using the certified SCOP and NSCC values, DOE determined each model's total power consumption for operation at the rating conditions specified in DOE's current test procedure. DOE then used fan performance data for each model to estimate the change in indoor fan power that would result from the lower ESP requirements in AHRI 1360-202X Draft and modified the total power consumption for each model by the calculated value. For several models, detailed fan performance data were not available, so DOE used fan performance data for comparable air conditioning units with similar cooling capacity, fan drive, and fan motor horsepower.

DOE also received manufacturer data (obtained through NDAs) showing the impact on efficiency and NSCC of the change in ESP requirements. Additionally, DOE conducted tests on an upflow-ducted CRAC at ESPs of 1 in. H_2O and 0.4 in. H_2O (the applicable ESP requirements specified in ANSI/ASHRAE 127-2007 and AHRI 1360-202X Draft, respectively), and included the results of those tests in this analysis.

For each of the three capacity ranges for which ESP requirements are specified in AHRI 1360-202X Draft, Table III-3 shows the approximate aggregated percentage increases in SCOP and NSCC associated with the decreased ESP requirements specified in AHRI 1360-202X Draft for upflow ducted units.

Table III-3 : Percentage Increase in SCOP and NSCC from Decreases in External Static Pressure Requirements for Upflow Ducted Units Between DOE's Current Test Procedure and AHRI 1360-202X Draft

<table>
<tr><th colspan="2">Net Sensible Cooling Capacity Range (kBtu/h)*</th><th>ESP Requirements in DOE’s Current Test Procedure (ANSI/ASHRAE 127-2007) (in H_2O)</th><th>ESP Requirements in AHRI 1360-202X Draft (in H_2O)</th><th>Approx. Average Percentage Increase in SCOP</th><th>Approx. Average Percentage Increase in NSCC</th></tr>
<tr><td colspan="2"><65</td><td>0.8</td><td>0.3</td><td>7</td><td>2</td></tr>
<tr><td rowspan="2">≥65 to <240</td><td>≥65 to <68.2**</td><td>0.8</td><td rowspan="2">0.4</td><td rowspan="2">8***</td><td rowspan="2">2***</td></tr>
<tr><td>≥68.2 to <240**</td><td>1</td></tr>
<tr><td colspan="2">≥240 to <760</td><td>1</td><td>0.5</td><td>6</td><td>2</td></tr>
</table>

* These boundaries are consistent with the boundaries in ANSI/ASHRAE 127-2007 and differ from the boundaries in AHRI 1360-202X Draft, which reflect the expected capacity increases for upflow-ducted and downflow equipment classes at the AHRI 1360-202X Draft return air temperature test conditions.
** 68.2 kBtu/h is equivalent to 20 kW, which is the capacity value that separates ESP requirements in ANSI/ASHRAE 127-2007, which is referenced in DOE’s current test procedure.
*** This average percentage increase is an average across upflow ducted CRACs with net sensible cooling capacity ≥65 and <240 kBtu/h, including models with capacity <20 kW and ≥ 20 kW. DOE’s Compliance Certification Database shows that most of the upflow CRACs with a net sensible cooling capacity ≥65 kBtu/h and < 240 kBtu/h have a net sensible cooling capacity ≥20 kW.

4. Power Adder to Account for Pump and Heat Rejection Fan Power in NSenCOP Calculation for Water-Cooled and Glycol-Cooled CRACs

Energy consumption for heat rejection components for air-cooled CRACs (*i.e.*, condenser fan motor(s)) is measured in the current DOE test procedure for CRACs; however, for water-cooled and glycol-cooled CRACs energy consumption for heat rejection components is not measured because these components (*i.e.*, water/glycol pump, dry cooler/cooling tower fan(s)) are not considered to be part of the CRAC unit. ANSI/ASHRAE 127-2007, which is referenced in DOE's current test procedure, does not include any factor in the calculation of SCOP to account for the power consumption of heat rejection components for water-cooled and glycol-cooled CRACs.

In contrast, AHRI 1360-202X Draft specifies to increase the measured total power input for CRACs to account for the power consumption of fluid pumps and heat rejection fans. Specifically, Sections 6.3.1.3 and 6.3.1.4 of AHRI 1360-202X Draft specify to add a percentage of the measured NSCC (5 percent for water-cooled CRACs and 7.5 percent for glycol-cooled CRACs) in kW to the total power input used to calculate NSenCOP. DOE calculated the impact of these additions on SCOP using Equation 1:

$$SCOP_1 = \frac{SCOP}{1 + (x * SCOP)}$$

Equation 1

Where, x is equal to 5 percent for water-cooled CRACs and 7.5 percent for glycol-cooled CRACs, and $SCOP_1$ is the SCOP value adjusted for the energy consumption of heat rejection pumps and fans.

5. Calculating Overall Changes in Measured Efficiency and Capacity from Test Procedure Changes

Different CRAC equipment classes are subject to different combinations of the test procedure changes between DOE's current test procedure and AHRI 1360-202X Draft analyzed in the crosswalk analyses. To combine the impact of the changes in rating conditions, DOE calculated the crosswalked NSenCOP levels and translated NSCC boundaries as detailed in the following sections.

a) Calculation of crosswalked NSenCOP levels

To combine the impact on SCOP of the changes to rating conditions (*i.e.*, increase in RAT, decrease in condenser EWT for water-cooled units, and decrease of the ESP requirements for upflow ducted units), DOE multiplied together the calculated adjustment factors representing the measurement changes corresponding to each individual rating condition change, as applicable, as shown in Equation 2. These adjustment factors are equal to 100 percent (which represents SCOP measured per the current Federal test procedure) plus the calculated percent change in measured efficiency.

To account for the impact of the adder for heat rejection pump and fan power for water-cooled and glycol-cooled units, DOE used Equation 3. Hence, DOE determined crosswalked NSenCOP levels corresponding to the current Federal SCOP standards for each CRAC equipment class using the following two equations.

$$NSenCOP_1 = SCOP * (1 + x_1) * (1 + x_2) * (1 + x_3)$$

Equation 2

$$NSenCOP = \frac{NSenCOP_1}{1 + (x_4 * NSenCOP_1)}$$

Equation 3

In these equations, $NSenCOP_1$ refers to a partially-crosswalked NSenCOP level that incorporates the impacts of changes in RAT, condenser EWT, and indoor fan ESP (as applicable), but not the impact of adding the heat rejection pump and fan power; x_1, x_2, and x_3 represent the percentage change in SCOP due to changes in RAT, condenser

EWT, and indoor fan ESP requirements, respectively; and x_4 is equal to 5 percent for water-cooled equipment classes and 7.5 percent for glycol-cooled equipment classes. For air-cooled classes, x_4 is equal to 0 percent; therefore, for these classes, NSenCOP is equal to NSenCOP_1.

b) Calculation of translated NSCC boundaries

To combine the impact on NSCC of the changes to rating conditions, DOE used a methodology similar to that used for determining the impact on SCOP. To determine adjusted NSCC equipment class boundaries, DOE multiplied together the calculated adjustment factors representing the measurement changes corresponding to each individual rating condition change, as applicable, as shown in Equation 4. These adjustment factors are equal to 100 percent (which represents NSCC measured per the current Federal test procedure) plus the calculated percent change in measured NSCC. In this equation, *Boundary* refers to the original NSCC boundaries (*i.e.*, 65,000 Btu/h, 240,000 Btu/h, or 760,000 Btu/h as determined according to ANSI/ASHRAE 127-2007), $Boundary_1$ refers to the updated NSCC boundaries as determined according to AHRI 1360-202X Draft, and y_1, y_2, and y_3 represent the percentage changes in NSCC due to changes in RAT, condenser EWT, and indoor fan ESP requirements, respectively.

$$Boundary_1 = Boundary * (1 + y_1) * (1 + y_2) * (1 + y_3)$$

Equation 4

As mentioned, ASHRAE Standard 90.1-2019 and AHRI 1360-202X Draft include updated equipment class capacity boundaries for only upflow-ducted and downflow equipment classes. The updated class ranges for these categories are <80,000 Btu/h, ≥80,000 Btu/h and <295,000 Btu/h, and ≥295,000 Btu/h. In previous versions of ASHRAE Standard 90.1, these ranges are <65,000 Btu/h, ≥65,000 Btu/h and <240,000

Btu/h, and ≥240,000 Btu/h. The capacity range boundaries for upflow non-ducted classes were left unchanged at 65,000 Btu/h and 240,000 Btu/h in ASHRAE Standard 90.1-2019.

DOE's capacity crosswalk analysis indicates that the primary driver for increasing NSCC is increasing RAT. The increases in RAT in AHRI 1360-202X Draft, as compared to ANSI/ASHRAE 127-2007, only apply to upflow ducted and downflow equipment classes. Based on the analysis performed for this document, DOE found that all the equipment class boundaries in ASHRAE Standard 90.1-2019, which are in increments of 5,000 Btu/h, vary by no more than 1.4 percent of the boundary translations calculated from DOE's capacity crosswalk. DOE considers this 1.4 percent variance to be de minimis because the only difference appears to be rounding – when rounded to increments of 5,000 Btu/h, DOE's crosswalk boundary translations are equivalent to the equipment class boundaries in ASHRAE 90.1-2019. As such, to align DOE's analysis more closely with ASHRAE Standard 90.1-2019, DOE has used the equipment class boundaries in ASHRAE Standard 90.1-2019 as the preliminary translated boundaries for the crosswalk analysis. Use of the equipment class boundaries from ASHRAE Standard 90.1-2019 allows for an appropriate comparison between the energy efficiency levels and equipment classes specified in ASHRAE Standard 90.1 and those in the current DOE standards, while addressing the backsliding potential from class switching discussed previously.

ASHRAE Standard 90.1-2019 does not include an upper capacity limit for coverage of CRACs. DOE's current standards are applicable only to CRACs with an NSCC less than 760,000 Btu/h, which is the upper boundary for very large commercial package air conditioning and heating equipment, the statutory limits on DOE's authority.[14] 10 CFR 431.97(e). However, the change in the ratings conditions in AHRI 1360-202X Draft means this boundary (calculated according to the current Federal test procedure, which references ANSI/ASHRAE 127-2007) must be expressed in its calculated equivalent for AHRI 1360-202X Draft under the crosswalk analysis. Otherwise, equipment currently covered and subject to the Federal standards may be removed from coverage, violating the anti-backsliding provision.

In order to account for all equipment currently subject to the Federal standards, DOE calculated the AHRI 1360-202X Draft equivalent of the 760,000 Btu/h equipment class boundary for certain equipment classes as part of its capacity crosswalk analysis. This translation of the upper boundary of the equipment classes applies only for downflow and upflow-ducted classes (the classes for which the RAT increase applies). Consistent with the adjustments made in ASHRAE Standard 90.1-2019, DOE averaged the crosswalked capacity results across the affected equipment classes, and rounded to the nearest 5,000 Btu/h. Following this approach, DOE has derived 930,000 Btu/h as the translated upper capacity limit for downflow and upflow-ducted CRACs in the analysis presented in this notice. The 930,000 Btu/h upper capacity limit (as measured per AHRI 1360-202X Draft) used in the crosswalk analysis is equivalent to the 760,000 Btu/h upper capacity limit (as measured per ANSI/ASHRAE 127-2007) established in the current DOE standards.

D. Crosswalk Results

[14] At the time EPCA was amended to include the definition for very large commercial package air conditioning and heating equipment, equipment covered by ASHRAE that met the statutory definition of "commercial package air conditioning and heating equipment" was generally comfort cooling equipment, which was rated according to the corresponding test procedures at 80°F / 67°F indoor air. The upper boundary of 760,000 Btu/h specified by EPCA (42 U.S.C. 6311(8)(D)) reflects a capacity rating at 80°F / 67°F indoor air. As discussed, DOE has tentatively translated the 760,000 Btu/h limit to an equivalent rating that is based on testing according to the conditions specified in the updated industry test procedure for CRAC. Consequently, DOE does not have authority to set standards for models with a capacity beyond the 760,000 Btu/h limit specified by EPCA, as translated to a rating measured per AHRI 1360-202X Draft.

The "crosswalked" DOE efficiency levels (expressed in terms of NSenCOP) and equipment class capacity boundaries (adjusted to account for changes in rating conditions) were then compared with the NSenCOP efficiency levels and capacity boundaries specified in ASHRAE Standard 90.1-2019 to determine the stringency of ASHRAE Standard 90.1-2019 requirements relative to current Federal standards.

Table III-4 presents the preliminary results for the crosswalk analyses (see section III.C of this document for a discussion of the methodology for the crosswalk analyses). The last column in the table, labeled "Crosswalk Comparison," indicates whether the ASHRAE Standard 90.1-2019 levels are less stringent, equivalent to, or more stringent than the current Federal standards, based on DOE's analysis.

Table III-4: Crosswalk Results

Condenser System Type	Airflow Configuration	Current NSCC Range (kBtu/h)	Current Federal Standard (SCOP)	Test Procedure Changes Affecting Efficiency*	Cross-walked NSCC Range (kBtu/h)	Cross-walked Current Federal Standard (NSenCOP)	ASHRAE Standard 90.1-2019 NSenCOP Level	Crosswalk Comparison
Air-cooled	Downflow	<65	2.20	Return air dry-bulb temperature	<80	2.62	2.70	More Stringent
Air-cooled	Downflow	≥65 and <240	2.10		≥80 and <295	2.50	2.58	More Stringent
Air-cooled	Downflow	≥240 and <760	1.90		≥295 and <930	2.26	2.36	More Stringent
Air-cooled with fluid economizer	Downflow	<65	2.20		<80	2.62	2.70	More Stringent
Air-cooled with fluid economizer	Downflow	≥65 and <240	2.10		≥80 and <295	2.50	2.58	More Stringent
Air-cooled with fluid economizer	Downflow	≥240 and <760	1.90		≥295 and <930	2.26	2.36	More Stringent

Water-cooled	Downflow	<65	2.60	Return air dry-bulb temperature Condenser entering water temperature Add allowance for heat rejection components to total power input	<80	2.73	2.82	More Stringent
Water-cooled	Downflow	≥65 and <240	2.50		≥80 and <295	2.63	2.73	More Stringent
Water-cooled	Downflow	≥240 and <760	2.40		≥295 and <930	2.54	2.67	More Stringent
Water-cooled with fluid economizer	Downflow	<65	2.55		<80	2.68	2.77	More Stringent
Water-cooled with fluid economizer	Downflow	≥65 and <240	2.45		≥80 and <295	2.59	2.68	More Stringent
Water-cooled with fluid economizer	Downflow	≥240 and <760	2.35		≥295 and <930	2.50	2.61	More Stringent
Glycol-cooled	Downflow	<65	2.50	Add allowance for heat rejection components to total power input	<80	2.43	2.56	More Stringent
Glycol-cooled	Downflow	≥65 and <240	2.15		≥80 and <295	2.15	2.24	More Stringent
Glycol-cooled	Downflow	≥240 and <760	2.10		≥295 and <930	2.11	2.21	More Stringent
Glycol-cooled with fluid economizer	Downflow	<65	2.45		<80	2.39	2.51	More Stringent
Glycol-cooled with fluid economizer	Downflow	≥65 and <240	2.10		≥80 and <295	2.11	2.19	More Stringent
Glycol-cooled with fluid economizer	Downflow	≥240 and <760	2.05		≥295 and <930	2.06	2.15	More Stringent
Air-cooled	Upflow Ducted	<65	2.09	Return air dry-bulb temperature ESP requirements	<80	2.65	2.67	More Stringent
Air-cooled	Upflow Ducted	≥65 and <240	1.99		≥80 and <295	2.55	2.55	Equivalent
Air-cooled	Upflow Ducted	≥240 and <760	1.79		≥295 and <930	2.26	2.33	More Stringent
Air-cooled with fluid	Upflow Ducted	<65	2.09		<80	2.65	2.67	More Stringent

economizer								
Air-cooled with fluid economizer	Upflow Ducted	≥65 and <240	1.99		≥80 and <295	2.55	2.55	Equivalent
Air-cooled with fluid economizer	Upflow Ducted	≥240 and <760	1.79		≥295 and <930	2.26	2.33	More Stringent
Water-cooled	Upflow Ducted	<65	2.49	Return air dry-bulb temperature Condenser entering water temperature ESP requirements Add allowance for heat rejection components to total power input	<80	2.77	2.79	More Stringent
Water-cooled	Upflow Ducted	≥65 and <240	2.39		≥80 and <295	2.70	2.70	Equivalent
Water-cooled	Upflow Ducted	≥240 and <760	2.29		≥295 and <930	2.56	2.64	More Stringent
Water-cooled with fluid economizer	Upflow Ducted	<65	2.44		<80	2.72	2.74	More Stringent
Water-cooled with fluid economizer	Upflow Ducted	≥65 and <240	2.34		≥80 and <295	2.65	2.65	Equivalent
Water-cooled with fluid economizer	Upflow Ducted	≥240 and <760	2.24		≥295 and <930	2.51	2.58	More Stringent
Glycol-cooled	Upflow Ducted	<65	2.39	Return air dry-bulb temperature ESP requirements Add allowance for heat rejection components to total power input	<80	2.47	2.53	More Stringent
Glycol-cooled	Upflow Ducted	≥65 and <240	2.04		≥80 and <295	2.19	2.21	More Stringent
Glycol-cooled	Upflow Ducted	≥240 and <760	1.99		≥295 and <930	2.11	2.18	More Stringent
Glycol-cooled with fluid economizer	Upflow Ducted	<65	2.34		<80	2.43	2.48	More Stringent
Glycol-cooled with fluid economizer	Upflow Ducted	≥65 and <240	1.99		≥80 and <295	2.14	2.16	More Stringent
Glycol-cooled with	Upflow Ducted	≥240 and <760	1.94		≥295 and <930	2.07	2.12	More Stringent

fluid economizer								
Air-cooled	Upflow Non-Ducted	<65	2.09	No changes	<65	2.09	2.16	More Stringent
Air-cooled	Upflow Non-Ducted	≥65 and <240	1.99		≥65 and <240	1.99	2.04	More Stringent
Air-cooled	Upflow Non-Ducted	≥240 and <760	1.79		≥240 and <760	1.79	1.89	More Stringent
Air-cooled with fluid economizer	Upflow Non-Ducted	<65	2.09		<65	2.09	2.09	Equivalent
Air-cooled with fluid economizer	Upflow Non-Ducted	≥65 and <240	1.99		≥65 and <240	1.99	1.99	Equivalent
Air-cooled with fluid economizer	Upflow Non-Ducted	≥240 and <760	1.79		≥240 and <760	1.79	1.81	More Stringent
Water-cooled	Upflow Non-Ducted	<65	2.49	Condenser entering water temperature Add allowance for heat rejection components to total power input	<65	2.25	2.43	More Stringent
Water-cooled	Upflow Non-Ducted	≥65 and <240	2.39		≥65 and <240	2.17	2.32	More Stringent
Water-cooled	Upflow Non-Ducted	≥240 and <760	2.29		≥240 and <760	2.09	2.20	More Stringent
Water-cooled with fluid economizer	Upflow Non-Ducted	<65	2.44		<65	2.21	2.35	More Stringent
Water-cooled with fluid economizer	Upflow Non-Ducted	≥65 and <240	2.34		≥65 and <240	2.13	2.24	More Stringent
Water-cooled with fluid economizer	Upflow Non-Ducted	≥240 and <760	2.24		≥240 and <760	2.05	2.12	More Stringent
Glycol-cooled	Upflow Non-Ducted	<65	2.39	Add allowance for heat	<65	2.03	2.08	More Stringent

Glycol-cooled	Upflow Non-Ducted	≥65 and <240	2.04	rejection components to total power input	≥65 and <240	1.77	1.90	More Stringent
Glycol-cooled	Upflow Non-Ducted	≥240 and <760	1.99		≥240 and <760	1.73	1.81	More Stringent
Glycol-cooled with fluid economizer	Upflow Non-Ducted	<65	2.34		<65	1.99	2.00	More Stringent
Glycol-cooled with fluid economizer	Upflow Non-Ducted	≥65 and <240	1.99		≥65 and <240	1.73	1.82	More Stringent
Glycol-cooled with fluid economizer	Upflow Non-Ducted	≥240 and <760	1.94		≥240 and <760	1.69	1.73	More Stringent

As indicated by the crosswalk, the standard levels established for CRACs in ASHRAE Standard 90.1-2019 are equivalent to the current Federal standards for six equipment classes and are more stringent than the current Federal standards for 48 equipment classes of CRACs. ASHRAE Standard 90.1-2019 also added 66 equipment classes of ceiling-mounted and horizontal-flow CRACs that did not require a crosswalk because there are currently no Federal standards for classes. As discussed in section V of this NOPR, DOE is proposing to adopt standards for horizontal-flow CRACs and ceiling-mounted CRACs. ASHRAE Standard 90.1-2019 also incorporates shifted capacity bin boundaries for upflow ducted and downflow CRAC equipment classes. DOE's crosswalk analysis indicates that these updated boundaries appropriately reflect the increase in NSCC that results from the changes in test procedure adopted under ASHRAE Standard 90.1-2019 and are equivalent to the capacity boundaries in the current Federal standards once those changes are accounted for (as discussed in previous sections).

E. Comments Received Regarding DOE's Crosswalk Methodology

DOE presented and requested comments on the crosswalk analysis and preliminary results in the September 2020 NODA/RFI. 85 FR 60642, 60653-60660 (Sept. 25, 2020).

AHRI and Joint Advocates agreed with DOE's crosswalk methodology and supported DOE's conclusion that ASHRAE Standard 90.1-2019 energy efficiency levels generally increase efficiency compared to current DOE Federal standards levels. (AHRI, No. 2 at p. 2; Joint Advocates, No. 6 at p. 2). AHRI noted that the AHRI members and DOE staff and consultants met extensively in 2018 to develop the crosswalk analysis. (AHRI, No. 2 at p. 2) DOE did not receive any other comments regarding the crosswalk analysis or the preliminary results.

For this NOPR, DOE relies on the crosswalk analysis and preliminary results as presented in the September 2020 NODA/RFI in which DOE identifies 48 equipment classes for which the ASHRAE Standard 90.1-2019 efficiency levels are more stringent than current DOE efficiency levels (expressed in NSenCOP), six equipment classes for which the ASHRAE Standard 90.1-2019 efficiency levels are equal to the current DOE efficiency levels, and 66 classes of CRACs that are not currently subject to DOE's standards but for which standards are specified in ASHRAE Standard 90.1-2019 (*i.e.*, horizontal-flow and ceiling-mounted classes).

IV. Methodology for Estimates of Potential Energy Savings from ASHRAE Standard 90.1-2019 Levels

In the September 2020 NODA/RFI DOE performed an analysis to determine the energy-savings potential of amending Federal standards to the amended ASHRAE levels for CRACs for which ASHRAE Standard 90.1-2019 specifies amended energy efficiency levels more stringent than the corresponding Federal energy conservation standards, as required under 42 U.S.C. 6313(a)(6)(A). 85 FR 60642, 60663 (Sept. 25, 2020). DOE's energy savings analysis was limited to equipment classes for which a market exists and for which sufficient data were available.

For the equipment classes where ASHRAE Standard 90.1-2019 specifies more-stringent levels than the corresponding Federal energy conservation standard, DOE calculated the potential energy savings to the Nation associated with adopting ASHRAE Standard 90.1-2019 as the difference between a no-new-standards case projection (i.e., without amended standards) and the ASHRAE Standard 90.1-2019 standards-case projection (i.e., with adoption of ASHRAE Standard 90.1-2019 levels).

The national energy savings (NES) refers to cumulative lifetime energy savings for equipment purchased in a 30-year period that differs by equipment (i.e., the compliance date differs by equipment class (i.e., capacity) depending upon whether DOE is acting under the ASHRAE trigger or the 6-year-lookback (see 42 U.S.C. 6313(a)(6)(D)). In the standards case, equipment that is more efficient gradually replaces less-efficient equipment over time. This affects the calculation of the potential energy savings, which are a function of the total number of units in use and their efficiencies. Savings depend on annual shipments and equipment lifetime. Inputs to the energy savings analysis are presented in the following sections.

A. Annual Energy Use

The purpose of the energy use analysis is to assess the energy savings potential of different equipment efficiencies in the building types that utilize the equipment. The

Federal standard and ASHRAE Standard 90.1-2019 levels are expressed in terms of an efficiency metric. For each equipment class, the description of how DOE developed estimates of annual energy consumption at the Federal baseline efficiency level and the ASHRAE Standard 90.1-2019 level can be found in section III.A.1 of the September 2020 NODA/RFI. 85 FR 60642, 60664-60666 (Sept. 25, 2020). In this NOPR, DOE briefly summarizes that analysis and responds to stakeholder comments. The annual unit energy consumption (UEC) estimates are displayed in Table IV-1 of this NOPR and form the basis of the national energy savings estimates discussed in section IV.E of this document.

1. Equipment Classes and Analytical Scope

In the September 2020 NODA/RFI, DOE conducted an energy savings analysis for the 42 CRAC classes that currently have both DOE standards and more-stringent standards under ASHRAE Standard 90.1-2019. 85 FR 60642, 60664 (Sept. 25, 2020). DOE was unable to identify market data that would allow for disaggregating results for the six equipment classes of air-cooled CRACs with fluid economizers that have ASHRAE Standard 90.1-2019 levels more stringent than current Federal standards. Furthermore, although ASHRAE Standard 90.1-2019 included levels for the 66 horizontal flow and ceiling-mounted equipment classes which currently are not subject to Federal standards, DOE was unable to identify market data that could be used to establish a market baseline for these classes in order to estimate energy savings at the time the September 2020 NODA/RFI was published. 85 FR 60642, 60663 - 60664 (Sept. 25, 2020). DOE did not receive any efficiency data in response to the September 2020 NODA/RFI, and is unaware of any publicly available data. Therefore, DOE was unable to develop a market baseline and estimate energy savings for the horizontal flow and ceiling mounted equipment classes for this NOPR. The UEC estimates (provided in Table

IV-1) were only developed for equipment classes for which DOE could develop a market baseline; therefore, they do not include the horizontal flow and ceiling-mounted classes.

Efficiency Levels

DOE analyzed the energy savings potential of adopting ASHRAE Standard 90.1-2019 levels for CRAC equipment classes that currently have a federal standard and have an ASHRAE Standard 90.1-2019 standard more stringent than the current Federal standard. For each equipment class, energy savings are measured relative to the baseline (*i.e.*, the current Federal standard for that class). 85 FR 60642, 60664 (Sept. 25, 2020).

2. Analysis Method and Annual Energy Use Results

In the September 2020 NODA/RFI, to derive UECs for the equipment classes analyzed in this document, DOE started with the UECs based on the current DOE standards for downflow equipment classes as analyzed in the May 2012 final rule. DOE assumed that these UECs correspond to the NSenCOP that was derived through the crosswalk analysis (i.e., "Cross-walked Current Federal Standard" column in Table III-4). DOE determined the UEC for the ASHRAE Standard 90.1-2019 level by dividing the baseline NSenCOP level by the NSenCOP for the ASHRAE Standard 90.1-2019 level and multiplied the resulting percentage by the baseline UEC. 85 FR 60642, 60664 (Sept. 25, 2020).

In the May 2012 final rule, DOE assumed that energy savings estimates derived for downflow equipment classes would be representative of upflow equipment classes, which differed by a fixed 0.11 SCOP. 77 FR 28928, 28954 (May 16, 2012). Because of the fixed 0.11 SCOP difference between upflow and downflow CRAC units in ASHRAE Standard 90.1-2013, DOE determined that the per-unit energy savings benefits for corresponding CRACs at higher efficiency levels could be represented using the 15 downflow equipment classes. *Id*. However, in this NOPR's analysis, the efficiency levels for the upflow non-ducted equipment classes do not differ from the downflow equipment class by a fixed amount. For the September 2020 NODA/RFI, DOE assumed that the fractional increase/decrease in NSenCOP between upflow and downflow units corresponds to a proportional decrease/increase in the baseline UEC within a given equipment class grouping of condenser system and capacity. 85 FR 60642, 60665 (Sept. 25, 2020). DOE sought comment on its energy-use analysis methodology in the September 2020 NODA/RFI.

AHRI stated that they continue to support DOE's proposed approach to determine the UEC of upflow units using the fractional increase or decrease in NSenCOP relative to the baseline downflow unit in a given equipment class grouping of condenser system and capacity. (AHRI, No. 2 at p. 3) Joint Advocates stated that they support DOE's conclusion that the UEC values for the ASHRAE Standard 90.1-2019 levels can be calculated based on the ratio of the baseline NSenCOP level and the ASHRAE Standard 90.1-2019 NSenCOP level. (Joint Advocates, No. 6 at p. 2) Based on the discussion above and consideration of the comments received, DOE has maintained its methodology for estimating UEC.

CA IOUs requested that DOE publish the efficiency curves used to calculate performance of CRACs at temperatures other than AHRI test conditions and provide background on how the curves were created. (CA IOUs, No. 5 at p. 3) The CA IOUs also requested that DOE publish the methodology employed to determine the effect of fluid economizers in the energy analysis. (CA IOUs, No. 5 at p. 3)

DOE notes that the UECs were derived from the analysis performed in the May 2012 final rule and the temperature bin analysis used to derive those UECs was published in Appendix 4B of the May 2012 final rule technical support document.[15] The methodology to determine the effect of fluid economizers, can be found in Chapter 4 of the May 2012 final rule technical support document.[16]

Table IV-1 shows UEC estimates for the equipment classes triggered by ASHRAE Standard 90.1-2019 (i.e., equipment classes for which the ASHRAE Standard 90.1-2019 energy efficiency level is more stringent than the current applicable Federal standard).

Table IV-1: National UEC Estimates (kWh/year) for CRAC Systems[1]

Condenser System Type	Airflow Configuration	Current Net Sensible Cooling Capacity	Current Federal Standard		ASHRAE Standard 90.1-2019	
			NSenCOP	UEC (kwh)	NSenCOP	UEC (kwh)
Air-cooled	Downflow	<65,000 Btu/h	2.62	27,411	2.70	26,599
		≥65,000 Btu/h and <240,000 Btu/h	2.50	102,762	2.58	99,575
		≥240,000 Btu/h and <760,000 Btu/h	2.26	246,011	2.36	235,587
	Upflow, ducted	<65,000 Btu/h	2.65	27,100	2.67	26,897
		≥240,000 Btu/h and <760,000 Btu/h	2.26	247,104	2.33	238,620
	Upflow, non-ducted	<65,000 Btu/h	2.09	34,362	2.16	33,248
		≥65,000 Btu/h and <240,000 Btu/h	1.99	129,097	2.04	125,933
		≥240,000 Btu/h and <760,000 Btu/h	1.79	310,606	1.89	294,172
Water-cooled	Downflow	<65,000 Btu/h	2.73	24,726	2.82	23,850
		≥65,000 Btu/h and <240,000 Btu/h	2.63	92,123	2.73	88,749

[15] *www.regulations.gov/document/EERE-2011-BT-STD-0029-0021.*
[16] *www.regulations.gov/document/EERE-2011-BT-STD-0029-0021.*

		≥240,000 Btu/h and <760,000 Btu/h	2.54	208,727	2.67	198,564
	Upflow, ducted	<65,000 Btu/h	2.77	24,280	2.79	24,106
		≥240,000 Btu/h and <760,000 Btu/h	2.56	207,096	2.64	200,821
	Upflow, non-ducted	<65,000 Btu/h	2.25	29,891	2.43	27,677
		≥65,000 Btu/h and <240,000 Btu/h	2.17	112,169	2.32	104,433
		≥240,000 Btu/h and <760,000 Btu/h	2.09	254,888	2.20	240,985
Water-cooled with fluid economizer	Downflow	<65,000 Btu/h	2.68	15,443	2.77	14,885
		≥65,000 Btu/h and <240,000 Btu/h	2.59	57,537	2.68	55,390
		≥240,000 Btu/h and <760,000 Btu/h	2.50	129,787	2.61	123,819
	Upflow, ducted	<65,000 Btu/h	2.72	15,159	2.74	15,048
		≥240,000 Btu/h and <760,000 Btu/h	2.51	128,753	2.58	125,259
	Upflow, non-ducted	<65,000 Btu/h	2.21	18,657	2.35	17,546
		≥65,000 Btu/h and <240,000 Btu/h	2.13	70,022	2.24	66,271
		≥240,000 Btu/h and <760,000 Btu/h	2.05	158,416	2.12	152,438
Glycol-cooled	Downflow	<65,000 Btu/h	2.43	24,671	2.56	23,419
		≥65,000 Btu/h and <240,000 Btu/h	2.15	101,844	2.24	97,297
		≥240,000 Btu/h and <760,000 Btu/h	2.11	227,098	2.21	215,794
	Upflow, ducted	<65,000 Btu/h	2.47	24,272	2.53	23,696
		≥65,000 Btu/h and <240,000 Btu/h	2.19	99,975	2.21	98,618
		≥240,000 Btu/h and <760,000 Btu/h	2.11	226,021	2.18	218,764
	Upflow, non-ducted	<65,000 Btu/h	2.03	29,679	2.08	28,823
		≥65,000 Btu/h and <240,000 Btu/h	1.77	123,833	1.90	114,708
		≥240,000 Btu/h and <760,000 Btu/h	1.73	275,668	1.81	263,483
Glycol-cooled with fluid economizer	Downflow	<65,000 Btu/h	2.39	19,813	2.51	18,866
		≥65,000 Btu/h and <240,000 Btu/h	2.11	81,668	2.19	78,312
		≥240,000 Btu/h and <760,000 Btu/h	2.06	182,034	2.15	174,414
	Upflow, ducted	<65,000 Btu/h	2.43	19,567	2.48	19,094

		≥65,000 Btu/h and <240,000 Btu/h	2.14	80,142	2.16	79,400
		≥240,000 Btu/h and <760,000 Btu/h	2.07	182,034	2.12	176,882
	Upflow, non-ducted	<65,000 Btu/h	1.99	23,796	2.00	23,677
		≥65,000 Btu/h and <240,000 Btu/h	1.73	99,135	1.82	94,232
		≥240,000 Btu/h and <760,000 Btu/h	1.69	221,888	1.73	216,757

[1] The air-cooled, upflow ducted, > 65,000 Btu/h and < 240,000 Btu/h; water-cooled, upflow ducted, > 65,000 Btu/h and < 240,000 Btu/h; and water-cooled with fluid economizer, upflow ducted, > 65,000 Btu/h and < 240,000 Btu/h equipment classes are not included in the table as the ASHRAE Standard 90.1-2019 levels for these classes are equivalent to the current Federal standard.

B. Shipments Analysis

DOE uses shipment projections by equipment class to calculate the national impacts of standards on energy consumption, as well as net present value and future manufacturer cash flows. DOE shipments projections typically are based on available historical data broken out by equipment classes. Current sales estimates allow for a more accurate model that captures recent trends in the market.

In the analysis presented in the September 2019 NODA/RFI, DOE performed a "bottom-up" calculation to estimate CRAC shipments based on the cooling demand required from CRAC-cooled data centers. 84 FR 48006, 48027-48030 (Sept. 11, 2019). In response to the September 2019 NODA/RFI, DOE received a confidential data submission from AHRI which provided DOE with a CRAC shipments time series from 2012-2018 and market shares broken out by the 30 Federal equipment classes. Accordingly, in the September 2020 NODA/RFI, DOE calibrated the stock of CRACs in the 2012 Commercial Buildings Energy Consumption Survey (CBECS 2012)[17] to an amount that would be equal to the number of 2012 shipments multiplied by the average

[17] U.S. Department of Energy – Energy Information Administration, 2012 CBECS Survey Data (Last accessed March 9, 2020) (Available at: *www.eia.gov/consumption/commercial/data/2012/*).

lifetime of a CRAC (*i.e.*, 15 years). Additional detail on the shipment and stock methodology can be found in the September 2020 NODA/RFI. 85 FR 60642, 60666-60668 (Sept. 25, 2020). DOE requested comments on this revised methodology in the September 2020 NODA/RFI. 85 FR 60642, 60668 (Sept. 25, 2020). AHRI commented that in the absence of better information, AHRI supports DOE's modified analysis using CBECS 2012. AHRI stated that the 2018 edition of CBECS (CBECS 2018) will better map equipment to end-use categories and that CBECS 2018 is expected to be published in November of this year. They commented that if DOE was able to use data from CBECS 2018, AHRI recommends modifying the analysis to include this updated information. AHRI also commented that there have been significant advances in the data center industry within the past decade and as a snapshot, the 2012 CBECS does not capture the industry shifting from enterprise data rooms in commercial buildings and data centers to the current strategy of edge computing on site, with data centers focused on co-location servers and cloud computing support. AHRI suggested that DOE review material published by organizations that study data center growth such as Gartner and the Uptime Institute. (AHRI No. 2 at p. 3) Trane suggested that using CBECS 2012 data might lead to underestimating the fast-moving CRAC market. They suggested using data from research and advisory companies that have updated definitions and attributes of data centers to 2020 and beyond. (Trane, No. 8 at p. 2)

In response to AHRI's comment on using CBECS 2018 data, DOE notes that the full data set from CBECS 2018 is not expected to be available until mid-2022.[18] Furthermore, in the September 2020 NODA/RFI, CBECS 2012 was used to develop a stock of CRACs that would match the shipments provided by AHRI in 2012, so the main driver of shipments analysis was the shipments time series and not CBECS 2012. To the

[18] *See www.eia.gov/consumption/commercial/.*

extent that updated CBECS data becomes available, DOE will consider such data in the evaluation of a final rule.

DOE did not update the analysis based on third party research from entities such as Uptime or Gartner because it was able to use the confidential national shipments data from AHRI to develop the shipments and stock model. Much of the third-party research is on the broader data center industry and not specifically CRACs, therefore DOE determined that the CRAC shipments data from AHRI was the best source for conducting the shipments analysis.

The CA IOUs sought clarification on the methodology to estimate data centers, particularly the following two statements: 1) In this NODA/RFI, DOE assumed that any building with a data center, regardless of the building's main cooling system, would use a CRAC, in order to account for the use of CRACs in edge computing centers and to align with the ASHRAE Standard 90.1 definition of a "computer room" and 2) all data centers without central chillers were assumed to have CRACs. (CA IOUs, No. 5, p. 3)

The CA IOUs also suggested that to help estimate the number of data centers using CRACs as compared to chilled water units, DOE should consider requesting shipment data from manufacturers for direct expansion (DX) CRACs and chilled water computer room air handlers. Alternatively, the CA IOUs suggested DOE could consider the data used in the California 2022 Title 24 Nonresidential Computer Room Efficiency CASE report which shows that 1/3 of computer room cooling uses chilled water. (CA IOUs, No. 5, p. 3) (*Id.*)

In response to the comment by the CA IOUs asking for clarification on the methodology to estimate data centers, DOE notes that the second statement is a typographical error in the September 2020 NODA/RFI. 85 FR 60642, 60668 (Sept. 25, 2020). The first statement reflects the methodology used to develop a stock of equipment for the September 2020 NODA/RFI, using CBECS 2012 to estimate the stock of CRACs to match the confidential shipments data provided by AHRI for the year 2012. 85 FR 60642, 60667 (Sept. 25, 2020). The second statement should read "all data centers were assumed to have CRACs." The reference to excluding CRACs in buildings with chilled water systems was based on the methodology DOE used in the September 2019 NODA/RFI. 84 FR 48006, 48027 (Sept.11, 2019). Subsequently, DOE updated its approach based on stakeholder comments and a confidential data submission of CRAC shipments received in response to the September 2019 NODA/RFI. The updated approach was included in the September 2020 NODA/RFI despite the typographical error. 85 FR 60642, 60667 (Sept. 25, 2020). In this NOPR, DOE is using the same analysis as the September 2020 NODA/RFI.

Regarding the suggestion for additional shipments data requests and the use of the California 2022 Title 24 Nonresidential Computer Room Efficiency CASE report, DOE notes that it relied on national shipments data for CRACs from 2012 to 2018 from AHRI and that was used to update the shipments analysis in the September 2020 NODA/RFI.

In the September 2020 NODA/RFI, DOE modeled oversizing in CRAC units with an oversize factor of 1.2, reduced from 1.3 in the September 2019 NODA/RFI based on stakeholder comments. 85 FR 60642, 60668 (Sept. 25, 2020). DOE requested comment on the methodology for estimating server power consumption and for any information or data on expectations of future server stock and energy use in small data centers.

In response, AHRI stated that they support DOE's proposal to reduce oversizing from a factor of 1.3 to 1.2; however, they contended that data center equipment was sized correctly but that the actual installed equipment includes redundant units. AHRI asserted that it is essential to understand that cooling equipment is sized to accommodate the maximum Information Technology (IT) load for the space, and that this load may not be present at the initial start-up of the data center but grows quickly as more IT load is added (AHRI, No. 2, p. 4).

DOE notes that while oversizing is intended for future growth, the speed at which that growth occurs can vary. Also, in response to the September 2019 NODA/RFI, the CA IOUs provided evidence of oversizing in the range of 20 to 30 percent. (CA IOUs, EERE-2017-BT-STD-0017-0006 at p. 3) Therefore, DOE reduced its oversizing factor but did not remove it altogether.

In the analysis conducted in the September 2020 NODA/RFI, DOE used the confidential shipments data provided by AHRI to calibrate its shipment model to produce a revised breakdown by equipment class. DOE then used a stock turnover model to project shipments over the 30-year shipments analysis period. The stock turnover model was broken into three cooling capacities (<65,000 Btu/h, ≥65,000 Btu/h and < 240,000 Btu/h, and ≥240,000 Btu/h and <760,000 Btu/h) and stock projections for each cooling capacity grew at a constant rate through the 30-year analysis period. 85 FR 60642, 60668-60669 (Sept. 25, 2020). Total shipments are projected to grow slightly over the analysis period as shown in Table IV-2 of this document.

Table IV-2: Projected Shipments

	< 65,000 Btu/h	≥65,000 Btu/h and < 240,000 Btu/h	≥240,000 Btu/h and <760,000 Btu/h	Total Shipments
2020 Shipments	3,208	2,132	3,190	8,530
2052 Shipments	2,634	3,650	3,178	9,462

The AHRI market share data provided to DOE in response to the September 2019 NODA/RFI were broken out by the 30 currently defined Federal equipment classes. DOE assumed upflow market share split evenly between the upflow ducted and upflow non-ducted equipment classes. DOE did not have any market share data on horizontal-flow, ceiling-mounted, and air-cooled with fluid economizer CRAC equipment classes; therefore, DOE was unable to disaggregate savings for these classes in the September 2020 NODA/RFI.

In the September 2020 NODA/RFI, DOE requested shipments data on horizontal-flow, ceiling-mounted, and air-cooled with fluid economizer CRAC equipment classes. AHRI commented that they were in the process of collecting shipments data on horizontal-flow, ceiling-mounted, and air-cooled with fluid economizer CRAC equipment classes, and that if the data met AHRI data collection requirements it would be submitted to DOE. (AHRI, No. 2 at p. 3)

DOE received data from AHRI that provided the percentage of total CRAC shipments by equipment class for horizontal-flow, ceiling-mounted, and floor mounted air-cooled with fluid economizer CRACs. However, the data provided did not include the available efficiency levels (in NSenCOP) of CRACs for sale within each equipment class, which would enable DOE to derive a market baseline for these equipment classes. DOE was unable to otherwise obtain such efficiency data. Without a market baseline, DOE is unable to estimate the potential energy savings from more efficient equipment. As such, the energy saving analysis does not include horizontal-flow, ceiling-mounted, or air-cooled with fluid economizer CRACs.

C. No-New-Standards-Case Efficiency Distribution

The no-new-standards case efficiency distribution is used to establish the market share of each efficiency level in the case where there is no new or amended standard. DOE is unaware of available market data that reports CRAC efficiency in terms of NSenCOP that can be used to determine the no-new-standards case efficiency distribution. In the September 2020 NODA/RFI, DOE requested efficiency data for CRACs in terms of NSenCOP that can be used to estimate the no-new-standards case efficiency distribution. 85 FR 60642, 60669-60670 (Sept. 25, 2020). DOE did not receive efficiency data in terms of NSenCOP and DOE is not aware of such data being available. Therefore, DOE has maintained the efficiency distribution used in the September 2020 NODA/RFI, which relied on DOE's Compliance Certification Database for CRACs which reports efficiency in terms of SCOP. DOE applied the crosswalk methodology discussed in section III.C. of this NOPR to translate each model's reported SCOP into NSenCOP.

DOE estimated the no-new-standards case efficiency distribution for each CRAC equipment class using model counts from DOE's Compliance Certification Database. DOE calculated the fraction of models that are above the current Federal baseline and below the ASHRAE Standard 90.1-2019 level and assigned this to the Federal baseline. All models that are at or above that ASHRAE Standard 90.1-2019 are assigned to the ASHRAE level. The no-new-standard case distribution for CRACs are presented in Table IV-3.

Table IV-3: No-New-Standards Case Efficiency Distribution for CRACs[1]

Condenser System Type	Airflow Configuration	Current Net Sensible Cooling Capacity	Federal Baseline Market Share	ASHRAE STANDARD 90.1-2019 Level Market Share
Air-cooled	Downflow	<65,000 Btu/h	2%	98%
		≥65,000 Btu/h and <240,000 Btu/h	22%	78%
		≥240,000 Btu/h and <760,000 Btu/h	20%	80%
	Upflow, ducted	<65,000 Btu/h	0%	100%
		≥240,000 Btu/h and <760,000 Btu/h	4%	96%
	Upflow, non-ducted	<65,000 Btu/h	4%	96%
		≥65,000 Btu/h and <240,000 Btu/h	11%	89%
		≥240,000 Btu/h and <760,000 Btu/h	23%	77%
Water-cooled	Downflow	<65,000 Btu/h	11%	89%
		≥65,000 Btu/h and <240,000 Btu/h	15%	85%
		≥240,000 Btu/h and <760,000 Btu/h	24%	76%
	Upflow, ducted	<65,000 Btu/h	0%	100%
		≥240,000 Btu/h and <760,000 Btu/h	13%	87%
	Upflow, non-ducted	<65,000 Btu/h	11%	89%
		≥65,000 Btu/h and <240,000 Btu/h	21%	79%
		≥240,000 Btu/h and <760,000 Btu/h	27%	73%
Water-cooled with fluid economizer	Downflow	<65,000 Btu/h	2%	98%
		≥65,000 Btu/h and <240,000 Btu/h	13%	87%
		≥240,000 Btu/h and <760,000 Btu/h	38%	62%
	Upflow, ducted	<65,000 Btu/h	2%	98%
		≥240,000 Btu/h and <760,000 Btu/h	13%	87%
	Upflow, non-ducted	<65,000 Btu/h	8%	92%
		≥65,000 Btu/h and <240,000 Btu/h	16%	84%
		≥240,000 Btu/h and <760,000 Btu/h	20%	80%
Glycol-cooled	Downflow	<65,000 Btu/h	57%	43%
		≥65,000 Btu/h and <240,000 Btu/h	31%	69%

		≥240,000 Btu/h and <760,000 Btu/h	36%	64%
	Upflow, ducted	<65,000 Btu/h	20%	80%
		≥65,000 Btu/h and <240,000 Btu/h	6%	94%
		≥240,000 Btu/h and <760,000 Btu/h	30%	70%
	Upflow, non-ducted	<65,000 Btu/h	20%	80%
		≥65,000 Btu/h and <240,000 Btu/h	38%	62%
		≥240,000 Btu/h and <760,000 Btu/h	30%	70%
Glycol-cooled with fluid economizer	Downflow	<65,000 Btu/h	57%	43%
		≥65,000 Btu/h and <240,000 Btu/h	31%	69%
		≥240,000 Btu/h and <760,000 Btu/h	31%	69%
	Upflow, ducted	<65,000 Btu/h	10%	90%
		≥65,000 Btu/h and <240,000 Btu/h	8%	92%
		≥240,000 Btu/h and <760,000 Btu/h	33%	67%
	Upflow, non-ducted	<65,000 Btu/h	2%	98%
		≥65,000 Btu/h and <240,000 Btu/h	30%	70%
		≥240,000 Btu/h and <760,000 Btu/h	27%	73%

[1] The air-cooled, upflow ducted, > 65,000 Btu/h and < 240,000 Btu/h; water-cooled, upflow ducted, > 65,000 Btu/h and < 240,000 Btu/h; and water-cooled with fluid economizer, upflow ducted, > 65,000 Btu/h and < 240,000 Btu/h equipment classes are not included in the table as the ASHRAE Standard 90.1-2019 for these equipment classes is equivalent to the current Federal standard.

D. Other Analytical Inputs

1. Equipment Lifetime

DOE defines "equipment lifetime" as the age at which a unit is retired from service. For the September 2019 NODA/RFI, DOE used a 15-year lifetime for all CRAC equipment classes based on the lifetime used in the May 2012 final rule. 84 FR 48006, 48030 (Sept. 11, 2019) (*citing* the May 2012 final rule at 77 FR 28928, 28958 (May 16, 2012)). In response to the September 2019 NODA/RFI, AHRI and Trane agreed that 15 years was a reasonable average lifetime. (AHRI, EERE-2017-BT-STD-0017-0007 at p. 7; Trane, EERE-2017-BT-STD-0017-0005 at p. 2) DOE maintained the 15-year average lifetime in the September 2020 NODA/RFI and received no comments on this issue. DOE continued to rely on a 15-year equipment lifetime for this NOPR.

2. Compliance Dates and Analysis Period

If DOE were to prescribe energy conservation standards at the efficiency levels contained in ASHRAE Standard 90.1-2019, EPCA provides that the compliance date shall be on or after a date that is two or three years (depending on the equipment type or size) after the effective date of the applicable minimum energy efficiency requirement in the amended ASHRAE standard. (42 U.S.C. 6313(a)(6)(D)) If ASHRAE Standard 90.1 does not specify an effective date, then the compliance date specified by statute would be dependent upon the publication date of ASHRAE 90.1-2019.

In this case, ASHRAE Standard 90.1-2019 does not specify an effective date for CRAC levels, therefore the publication date of October 23, 2019, was used to determine the compliance dates for estimating the energy savings potential of adopting ASHRAE Standard 90.1-levels.

For equipment classes for which the ASHRAE Standard 90.1 levels are more stringent than the current Federal standards (i.e., classes for which DOE is triggered), if DOE were to prescribe standards more stringent than the efficiency levels contained in ASHRAE Standard 90.1–2019, EPCA dictates that the compliance date must be on or after a date which is four years after the date of publication of a final rule in the Federal Register. (42 U.S.C. 6313(a)(6)(D)) For equipment classes for which DOE is acting under its 6-year lookback authority, if DOE were to adopt more-stringent standards, EPCA states that the compliance date for any such standard shall be after a date that is the later of the date three years after publication of the final rule establishing a new standard or the date six years after the effective date for the current standard. (42 U.S.C.

6313(a)(6)(C)(iv)) As discussed in Section V of this NOPR, DOE is not proposing standards for CRACs that are more stringent than the levels contained in ASHRAE Standard 90.1-2019.

For purposes of calculating the NES for the equipment in this evaluation, DOE used a 30-year analysis period starting with the assumed year of compliance listed in Table IV-4 for equipment analyzed in the September 2020 NODA/RFI. This is the standard analysis period of 30 years that DOE typically uses in its NES analysis. For equipment classes with a compliance date in the last six months of the year, DOE starts its analysis period in the first full year after compliance. For example, if CRACs less than 65,000 Btu/h were to have a compliance date of October 23, 2021, the analysis period for calculating NES would begin in 2022 and extend to 2051.

Table IV-4: Analyzed Compliance Dates of Amended Energy Conservation Standards for Triggered Equipment Classes

Equipment Class	Analyzed Compliance Dates for Efficiency Levels in ASHRAE Standard 90.1-2019
Computer Room Air Conditioners	
Equipment with current NSCC <65,000 Btu/h	10/23/2021
Equipment with current NSCC ≥65,000 and <240,000 Btu/h	10/23/2022
Equipment with current NSCC ≥240,000 Btu/h and <760,000 Btu/h	10/23/2022

In response to the September 2020 NODA/RFI, AHRI noted that the September 2020 NODA/RFI mentioned different compliance dates for CRACs with NSCC less than 65,000 Btu/h and for CRACs with NSCC greater than 65,000 Btu/h but less than 240,000 Btu/h, with CRACs with NSCC less than 65,000 Btu/h having a compliance effective date one year earlier. (AHRI, No.2 at p. 2) AHRI stated that they understood that this difference stems from EPCA requirements but urged DOE to harmonize compliance on the same date, i.e., October 23, 2022, stating that it would be unnecessarily confusing for manufacturers and other stakeholders to manage separate compliance dates. *Id*.

The analysis presented in this NOPR relies on the minimum compliance dates provided under EPCA for the energy conservation standards as proposed. As discussed in section V.D, DOE considered the various applicable lead-times required by EPCA, and proposes that the compliance date for amended standards for all CRAC equipment classes would be 360 days after the publication date of the final rule adopting amended energy conservation standards.

E. Estimates of Potential Energy Savings

DOE estimated the potential site, primary, and FFC energy savings in quads (*i.e.*, 10^{15} Btu) for adopting ASHRAE Standard 90.1-2019 within each equipment class analyzed. The potential energy savings of adopting ASHRAE Standard 90.1-2019 levels are measured relative to the current Federal standards. Table IV-5 shows the potential energy savings resulting from the analyses conducted for CRACs. The reported energy savings are cumulative over the period in which equipment shipped in the 30-year analysis continues to operate. The national energy savings estimates are identical to those provided in the September 2020 NODA/RFI. *See* 85 FR 60642, 60672 (Sep. 25, 2020).

Table IV-5: Potential Energy Savings of Adopting ASHRAE Standard 90.1-2019 for CRACs[1]

Condenser System Type	Airflow Configuration	Current Net Sensible Cooling Capacity	ASHRAE Efficiency Level	Site Savings	Primary Savings	FFC Savings
			NSenCOP	Quads	quads	quads
Air-cooled	Downflow	<65,000 Btu/h	2.70	0.0000	0.0000	0.0000

		≥65,000 Btu/h and <240,000 Btu/h	2.58	0.0011	0.0029	0.0030
		≥240,000 Btu/h and <760,000 Btu/h	2.36	0.0071	0.0185	0.0193
	Upflow, ducted	<65,000 Btu/h	2.67	0.0000	0.0000	0.0000
		≥240,000 Btu/h and <760,000 Btu/h	2.33	0.0001	0.0003	0.0003
	Upflow, non-ducted	<65,000 Btu/h	2.16	0.0000	0.0001	0.0001
		≥65,000 Btu/h and <240,000 Btu/h	2.04	0.0003	0.0007	0.0008
		≥240,000 Btu/h and <760,000 Btu/h	1.89	0.0014	0.0037	0.0039
Water-cooled	Downflow	<65,000 Btu/h	2.82	0.0000	0.0000	0.0000
		≥65,000 Btu/h and <240,000 Btu/h	2.73	0.0001	0.0003	0.0003
		≥240,000 Btu/h and <760,000 Btu/h	2.67	0.0003	0.0007	0.0008
	Upflow, ducted	<65,000 Btu/h	2.79	0.0000	0.0000	0.0000
		≥240,000 Btu/h and <760,000 Btu/h	2.64	0.0000	0.0001	0.0001
	Upflow, non-ducted	<65,000 Btu/h	2.43	0.0001	0.0004	0.0004
		≥65,000 Btu/h and <240,000 Btu/h	2.32	0.0002	0.0005	0.0006
		≥240,000 Btu/h and <760,000 Btu/h	2.20	0.0001	0.0003	0.0003
Water-cooled with fluid economizer	Downflow	<65,000 Btu/h	2.77	0.0000	0.0000	0.0000
		≥65,000 Btu/h and <240,000 Btu/h	2.68	0.0000	0.0000	0.0000
		≥240,000 Btu/h and <760,000 Btu/h	2.61	0.0001	0.0002	0.0002
	Upflow, ducted	<65,000 Btu/h	2.74	0.0000	0.0000	0.0000
		≥240,000 Btu/h and <760,000 Btu/h	2.58	0.0000	0.0000	0.0000
	Upflow, non-ducted	<65,000 Btu/h	2.35	0.0000	0.0000	0.0000
		≥65,000 Btu/h and <240,000 Btu/h	2.24	0.0000	0.0000	0.0000
		≥240,000 Btu/h and <760,000 Btu/h	2.12	0.0000	0.0000	0.0000
Glycol-cooled	Downflow	<65,000 Btu/h	2.56	0.0000	0.0000	0.0000
		≥65,000 Btu/h and <240,000 Btu/h	2.24	0.0001	0.0002	0.0002
		≥240,000 Btu/h and <760,000 Btu/h	2.21	0.0001	0.0003	0.0003
	Upflow, ducted	<65,000 Btu/h	2.53	0.0000	0.0000	0.0000
		≥65,000 Btu/h and <240,000 Btu/h	2.21	0.0000	0.0000	0.0000
		≥240,000 Btu/h and <760,000 Btu/h	2.18	0.0000	0.0000	0.0000
	Upflow, non-ducted	<65,000 Btu/h	2.08	0.0000	0.0000	0.0000
		≥65,000 Btu/h and <240,000 Btu/h	1.90	0.0001	0.0003	0.0003

		≥240,000 Btu/h and <760,000 Btu/h	1.81	0.0000	0.0001	0.0001
Glycol-cooled with fluid economizer	Downflow	<65,000 Btu/h	2.51	0.0000	0.0001	0.0001
		≥65,000 Btu/h and <240,000 Btu/h	2.19	0.0003	0.0007	0.0007
		≥240,000 Btu/h and <760,000 Btu/h	2.15	0.0009	0.0022	0.0023
	Upflow, ducted	<65,000 Btu/h	2.48	0.0000	0.0000	0.0000
		≥65,000 Btu/h and <240,000 Btu/h	2.16	0.0000	0.0000	0.0000
		≥240,000 Btu/h and <760,000 Btu/h	2.12	0.0002	0.0004	0.0004
	Upflow, non-ducted	<65,000 Btu/h	2.00	0.0000	0.0000	0.0000
		≥65,000 Btu/h and <240,000 Btu/h	1.82	0.0003	0.0007	0.0008
		≥240,000 Btu/h and <760,000 Btu/h	1.73	0.0001	0.0003	0.0003

[1] The air-cooled, upflow ducted, > 65,000 Btu/h and < 240,000 Btu/h; water-cooled, upflow ducted, > 65,000 Btu/h and < 240,000 Btu/h; and water-cooled with fluid economizer, upflow ducted, > 65,000 Btu/h and < 240,000 Btu/h equipment classes are not included in the table as the ASHRAE Standard 90.1-2019 level for these equipment classes is equivalent to the current Federal standard.

V. Conclusions

A. Consideration of More-Stringent Efficiency Levels

EPCA requires DOE to establish an amended uniform national standard for equipment classes at the minimum level specified in the amended ASHRAE Standard 90.1 unless DOE determines, by rule published in the *Federal Register*, and supported by clear and convincing evidence, that adoption of a uniform national standard more stringent than the amended ASHRAE Standard 90.1 for the equipment class would result in significant additional conservation of energy and is technologically feasible and economically justified. (42 U.S.C. 6313(a)(6)(A)(ii)(I)-(II)) In the September 2020 NODA/RFI, DOE requested data and information that could help determine whether standards levels more stringent than the levels in ASHRAE Standard 90.1-2019 for CRACs would result in significant additional energy savings for classes for which DOE was triggered. DOE also requested data and information that could help determine whether standards levels more stringent than the levels in ASHRAE Standard 90.1-2019 for CRACs would result in significant additional energy savings for classes for which DOE was not triggered (i.e., classes reviewed under the six-year look back provision). 85 FR 60642, 60674-60675 (September 25, 2020).

AHRI stated that while more stringent levels may result in additional energy savings, the added costs to the manufacturers and ultimately their customers would negate much of the savings. AHRI stated that they support the full adoption of the amended ASHRAE Standard 90.1 levels for all classes of CRACs. (AHRI, No. 2 at pp. 4-5) Rheem also commented that they generally support the adoption of ASHRAE Standard 90.1 for all classes of CRACs. (Rheem, No. 4 at p. 1)

Joint Advocates and CA IOUs encouraged DOE to evaluate more-stringent standards than the ASHRAE Standard 90.1-2019 levels, and said that they disagreed with DOE's preliminary conclusion in the September 2020 NODA/RFI that the test metric change created uncertainty that would prevent an adequate evaluation of more stringent standards. (Joint Advocates, No. 6 at pp. 3-4; CA IOUs, No. 5 at p. 2) These commenters asserted that only when economic analyses are complete can the determination be made as to whether the statutory "clear and convincing evidence" requirement has been met. *Id.* CA IOUs further encouraged DOE to evaluate on a case-by-case basis whether the standard of "clear and convincing evidence" of energy savings has been met for increasing stringency of standards when there is a metric change. (CA IOUs, No. 5 at p. 2) Additionally, CA IOUs presented the concern that if DOE were to generalize their position taken in the September 2020 NODA/RFI to other product categories, some members of the ASHRAE Standard 90.1 committee will be less likely to support updates to the test procedure if they believe that DOE will use the update as a reason to decline to conduct further analysis. *Id*.

Joint Advocates commented that DOE's crosswalk analysis presented in the September 2020 NODA/RFI had already been vetted by stakeholders and would lead to reasonable accounting of potential energy savings. (Joint Advocates, No. 6 at p. 3) Joint Advocates also asserted that energy savings from adopting standards for CRACs more stringent than the ASHRAE Standard 90.1-2019 levels have the potential to be significant, given the annual energy consumption and range of potential efficiencies for CRACs. *Id*. The commenter further stated that it is not unprecedented for DOE to adopt amended standards at levels higher than the ASHRAE Standard 90.1 levels based on a revised metric, referencing a prior standards rulemaking for air-cooled commercial unitary air conditioners (ACUACs), in which DOE adopted integrated energy efficiency ratio (IEER) standards at levels that were more stringent than the corresponding ASHRAE 90.1 levels, in a 2016 direct final rule (81 FR 2419). *Id* at p. 4.

In response to AHRI's comment that more stringent levels would add costs to manufacturers and customers that would negate much of the savings, DOE notes that a full consideration of more stringent levels, if undertaken, would assess manufacturer, consumer, and national impacts.

In response to comments from Joint Advocates and CA IOUs, DOE notes that it makes determinations pursuant to the ASHRAE trigger (and the six-year look back review) by evaluating the information and data available specific to the equipment under review. In this NOPR, DOE is not making a general determination that the clear and convincing evidence threshold cannot be met in instances in which there is a metric change. The preliminary position taken in the September 2020 NODA/RFI and in this NOPR on whether the clear and convincing evidence requirement for showing that more stringent standards would result in significant additional energy savings is specific to CRACs. As suggested by CA IOUs, DOE makes this determination on a case-by-case basis. As to the concern that the preliminary determination put forward in this NOPR may cause some members of the ASHRAE Standard 90.1 committee to be less likely to support updates to industry test procedures, DOE notes that EPCA requires DOE to review periodically the test procedures for covered equipment, and make amendments to the extent justified. (42 U.S.C. 6314(a)(1))

As discussed in the September 2020 NODA/RFI, an estimation of energy savings potentials of energy efficiency levels more stringent than the amended ASHRAE Standard 90.1 levels would require developing efficiency data for the entire CRAC market in terms of the NSenCOP metric. 85 FR 60642, 60673 (Sept 25, 2020). Because there are minimal market efficiency data currently available in terms of NSenCOP, this would require a crosswalk analysis much broader than the analysis used to evaluate ASHARE 90.1-2019 levels. 85 FR 60642, 60674 (Sept 25, 2020). The crosswalk analysis presented in this NOPR (analyzing ASHRAE 90.1-2019 levels) required only that DOE translate the efficiency levels between the metrics at the baseline levels, and not that DOE translate all efficiency levels currently represented in the market (*i.e.*, high efficiency levels). To obtain NSenCOP market data for purposes of analysis of standard levels more stringent than ASHRAE Standard 90.1-2019, DOE would be required to translate the individual SCOP ratings to NSenCOP ratings for all CRAC models certified in DOE's Compliance Certification Management System (CCMS) Database. As the range of model efficiencies increases, so does the number of different technologies used to achieve such efficiencies. With this increase in variation, there is an increase in the potential for variation in the crosswalk results from the actual performance under the new metric of the analyzed models. As noted, there is limited market data regarding the performance of CRACs as represented according to the updated metric, and there is not a comparable industry analysis (i.e., translating ratings to the updated metric for all models on the market) for comparison. 85 FR 60642, 60674 (Sept 25, 2020).

Because of the lack of market data and the test metric change, and DOE is tentatively unable to determine via clear and convincing evidence that a more stringent standard level would result in significant additional conservation of energy and is technologically feasible and economically justified. DOE has tentatively decided not to conduct further analysis for this particular rulemaking because DOE lacks the data to assess potential energy conservation. In this specific instance, DOE disagrees with comments from CA IOUs and Joint Advocates that the statutory clear and convincing evidence criterion can only be assessed after full economic analyses have been conducted. EPCA requires that DOE determine, supported by clear and convincing evidence, that adoption of a uniform national standard more stringent than the amended ASHRAE Standard 90.1 for CRAC would result in significant additional conservation of energy *and* is technologically feasible *and* economically justified. (42 U.S.C. 6313(a)(6)(A)(ii)(II); *emphasis added*) The inability to make a determination, supported by clear and convincing evidence, with regard to any one of the statutory criteria prohibits DOE from adopting more stringent standards regardless of determinations as to the other criteria. DOE has tentatively determined that at this time there is sufficient lack of data specific to CRACs (including but not limited to market efficiency data in terms of the new efficiency metric) to preclude clear and convincing evidence of significant additional energy savings from CRAC efficiency levels more stringent than ASHRAE 90.1-2019 levels.

The past ACUAC rulemaking (that Joint Advocates cited as precedent) was not analogous to the present situation for CRACs, because at the time that ACUAC rulemaking began, the IEER metric was already in use by the ACUAC industry. *See* 81 FR 2419, 2441 (Jan. 15, 2014).[19] Specifically, the vast majority of ACUAC models on the market were already rated for IEER (in addition to EER, which was the federally regulated metric at the time), and these IEER market data for ACUACs were available in the AHRI Directory at the time.[20]

In contrast, during development of this NOPR, there were minimal available NSenCOP market data. Specifically, DOE identified NSenCOP market data for less than 3 percent of the CRAC models certified in DOE's Certification Compliance Database. DOE requested efficiency data in terms of NSenCOP in the September 2020 NODA/RFI but received no such data. DOE presumes that this is because CRAC manufacturers are not yet using the new test metric (NSenCOP) to rate equipment, unlike in the discussed ACUAC rulemaking.

After considering the stakeholder comments, and the lack of sufficient NSenCOP market data available following the September 2020 NODA/RFI, DOE maintains its preliminary decision not to conduct additional analysis of more stringent standards for this rulemaking. The lack of market and performance data in terms of the new metric limits the analysis of energy savings that would result from efficiency levels more stringent than the amended ASHRAE Standard 90.1-2019 levels for this equipment.

---

[19] DOE noted that AHRI Standard 340/360–2007 already included methods and procedures for testing and rating equipment with the IEER metric. ASHRAE, through its Standard 90.1, includes requirements based on the part-load performance metric, IEER. These IEER requirements were first established in Addenda to the 2008 Supplement to Standard 90.1– 2007, and were required for compliance with ASHRAE Standard 90.1 on January 1, 2010. *Id.*

[20] As part of a NODA/RFI for energy conservation standards for ACUACs published on February 1, 2013 (78 FR 7296), DOE made available a document that provides the methodology and results of an investigation of EER and IEER market data for ACUACs. See Docket No. EERE-2013-BT-STD-0007-0001.

Given the limits of any energy use analysis resulting from the lack of data, DOE has tentatively concluded that it lacks clear and convincing evidence that more stringent standards would result in a significant additional amount of energy savings as required for DOE to establish more-stringent standards.

DOE has tentatively determined that due to the lack of market and performance data for the CRAC market as a whole in terms of NSenCOP, it is unable to estimate potential energy savings from more stringent standards that meets the clear and convincing evidence threshold required by statute to justify standards more stringent than the amended ASHRAE Standard 90.1 efficiency levels for CRACs.

B. Review Under Six-Year Lookback Provision

As discussed, DOE is required to conduct an evaluation of each class of covered equipment in ASHRAE Standard 90.1 every six years. (42 U.S.C. 6313(a)(6)(C)(i)) DOE may only adopt more stringent standards pursuant to the six-year look-back review if the Secretary determines, supported by clear and convincing evidence, that the adoption more stringent standards would result in significant additional conservation of energy and is technologically feasible and economically justified. (42 U.S.C. 6313(a)(6)(C)(i); 42 U.S.C. 6313(a)(6)(A)(ii)(II)) The analysis under the look-back provision incorporates the same standards and factors as the analysis for whether DOE should adopt a more stringent standard than an amended ASHRAE Standard 90.1 standard. *Id.* Accordingly, DOE is here evaluating the six CRAC equipment classes for which ASHRAE Standard 90.1-2019 did not increase the stringency of the standards.

Similar to the triggered classes discussed in section V.A of this NOPR, there are limited NSenCOP data for CRACs within each of these six classes and there is not a comparable industry analysis (i.e., translating ratings to the updated metric for all models on the market) for comparison. While the crosswalk analysis required only that DOE translate the efficiency levels at the baseline levels, the analysis needed to evaluate whether amended standards more stringent than ASHRAE Standard 90.1-2019 would result in significant energy savings and be technologically feasible and economically justified under the clear and convincing threshold would require more than baseline data – it would require NSenCOP data across all efficiency levels on the market.

Therefore, in line with the same initial reasoning presented in DOE's evaluation of more stringent standards for those classes of CRAC for which ASHRAE updated the industry standards, DOE initially determines that the clear and convincing evidence threshold is not met for these six classes. As such, DOE did not conduct an energy savings analysis of standard levels more stringent than the current Federal standard levels for the classes of CRAC not triggered by ASHRAE Standard 90.1-2019 (*i.e.,* the six classes of CRAC for which ASHRAE Standard 90.1-2019 does not specify more stringent minimum efficiency levels).

C. Definition for Ducted Condenser

As indicated, ASHRAE Standard 90.1-2019 includes separate equipment classes for ceiling-mounted CRACs with ducted condensers. The current definitions at 10 CFR 431.92 do not include a definition of "ducted condenser". Because DOE is proposing to adopt efficiency standards for these ceiling-mounted CRAC equipment classes with "ducted condenser", DOE is proposing to define the following definition for "ducted condenser" at 10 CFR 431.92, which is consistent with the definition specified in section 3.7.1 of AHRI 1360-202X Draft.

Ducted Condenser means a configuration of computer room air conditioner for which the condenser or condensing unit that manufacturer's installation instructions indicate is intended to exhaust condenser air through a duct(s).

D. Proposed Energy Conservation Standards

DOE proposes amended energy conservation standards for CRACs by adopting the efficiency levels specified for CRACs in ASHRAE Standard 90.1-2019. The proposed standards, which are expressed in NSenCOP, are shown in Table V-1 and Table V-2 of this document. These proposed standards, if adopted, would apply to all CRACs listed in Table V-1 and Table V-2 of this document. Table I-2 manufactured in, or imported into, the United States starting on the compliance date as discussed in the following paragraphs.

Table V-1: Proposed Standards for Floor-Mounted CRACs

Equipment type	Net sensible cooling capacity[21]	Minimum NSenCOP efficiency		Net sensible cooling capacity	Minimum NSenCOP efficiency	
		Downflow	Upflow ducted		Upflow non-ducted	Horizontal flow
Air-Cooled	<80,000 Btu/h	2.70	2.67	<65,000 Btu/h	2.16	2.65
	≥80,000 Btu/h and <295,000 Btu/h	2.58	2.55	≥65,000 Btu/h and <240,000 Btu/h	2.04	2.55
	≥295,000 Btu/h and <930,000 Btu/h	2.36	2.33	≥240,000 Btu/h and <760,000 Btu/h	1.89	2.47
Air-Cooled with Fluid Economizer	<80,000 Btu/h	2.70	2.67	<65,000 Btu/h	2.09	2.65
	≥80,000 Btu/h and <295,000 Btu/h	2.58	2.55	≥65,000 Btu/h and <240,000 Btu/h	1.99	2.55
	≥295,000 Btu/h and <930,000 Btu/h	2.36	2.33	≥240,000 Btu/h and <760,000 Btu/h	1.81	2.47
Water-Cooled	<80,000 Btu/h	2.82	2.79	<65,000 Btu/h	2.43	2.79

[21] DOE has used 930,000 Btu/h as the adjusted upper capacity limit for downflow and upflow ducted CRACs in the analysis presented in this notice (see Section III.C). The 930,000 Btu/h upper capacity limit (as measured per AHRI 1360-202X Draft) used in the crosswalk analysis is equivalent to the 760,000 Btu/h upper capacity limit (as measured per ANSI/ASHRAE 127-2007) established in the current DOE standards.

	≥80,000 Btu/h and <295,000 Btu/h	2.73	2.70	≥65,000 Btu/h and <240,000 Btu/h	2.32	2.68
	≥295,000 Btu/h and <930,000 Btu/h	2.67	2.64	≥240,000 Btu/h and <760,000 Btu/h	2.20	2.60
Water-Cooled with a Fluid Economizer	<80,000 Btu/h	2.77	2.74	<65,000 Btu/h	2.35	2.71
	≥80,000 Btu/h and <295,000 Btu/h	2.68	2.65	≥65,000 Btu/h and <240,000 Btu/h	2.24	2.60
	≥295,000 Btu/h and <930,000 Btu/h	2.61	2.58	≥240,000 Btu/h and <760,000 Btu/h	2.12	2.54
Glycol-Cooled	<80,000 Btu/h	2.56	2.53	<65,000 Btu/h	2.08	2.48
	≥80,000 Btu/h and <295,000 Btu/h	2.24	2.21	≥65,000 Btu/h and <240,000 Btu/h	1.90	2.18
	≥295,000 Btu/h and <930,000 Btu/h	2.21	2.18	≥240,000 Btu/h and <760,000 Btu/h	1.81	2.18
Glycol-Cooled with a Fluid Economizer	<80,000 Btu/h	2.51	2.48	<65,000 Btu/h	2.00	2.44
	≥80,000 Btu/h and <295,000 Btu/h	2.19	2.16	≥65,000 Btu/h and <240,000 Btu/h	1.82	2.10
	≥295,000 Btu/h and <930,000 Btu/h	2.15	2.12	≥240,000 Btu/h and <760,000 Btu/h	1.73	2.10

Table V-2: Proposed Standards for Ceiling-Mounted CRACs

Equipment type	Net sensible cooling capacity	Minimum NSenCOP efficiency	
		Ducted	Non-Ducted
Air-Cooled with Free Air Discharge Condenser	<29,000 Btu/h	2.05	2.08
	≥29,000 Btu/h and <65,000 Btu/h	2.02	2.05
	≥65,000 Btu/h	1.92	1.94
Air-Cooled with Free Air Discharge Condenser and Fluid Economizer	<29,000 Btu/h	2.01	2.04
	≥29,000 Btu/h and <65,000 Btu/h	1.97	2.00
	≥65,000 Btu/h	1.87	1.89
Air-Cooled with Ducted Condenser	<29,000 Btu/h	1.86	1.89
	≥29,000 Btu/h and <65,000 Btu/h	1.83	1.86

	≥65,000 Btu/h	1.73	1.75
Air-Cooled with Fluid Economizer and Ducted Condenser	<29,000 Btu/h	1.82	1.85
	≥29,000 Btu/h and <65,000 Btu/h	1.78	1.81
	≥65,000 Btu/h	1.68	1.70
Water-Cooled	<29,000 Btu/h	2.38	2.41
	≥29,000 Btu/h and <65,000 Btu/h	2.28	2.31
	≥65,000 Btu/h	2.18	2.20
Water-Cooled with Fluid Economizer	<29,000 Btu/h	2.33	2.36
	≥29,000 Btu/h and <65,000 Btu/h	2.23	2.26
	≥65,000 Btu/h	2.13	2.16
Glycol-Cooled	<29,000 Btu/h	1.97	2.00
	≥29,000 Btu/h and <65,000 Btu/h	1.93	1.98
	≥65,000 Btu/h	1.78	1.81
Glycol-Cooled with Fluid Economizer	<29,000 Btu/h	1.92	1.95
	≥29,000 Btu/h and <65,000 Btu/h	1.88	1.93
	≥65,000 Btu/h	1.73	1.76

As noted, in instances in which DOE is amending an energy conservation standard for CRAC in response to updates to ASHRAE Standard 90.1, EPCA specifies certain compliance lead times based on equipment capacity. If DOE were to prescribe energy conservation standards at the efficiency levels contained in the updated ASHRAE Standard 90.1, EPCA states that any such standard shall become effective on or after a date that is two or three years (depending on the equipment type or size) after the effective date of the applicable minimum energy efficiency requirement in the amended ASHRAE standard. (42 U.S.C. 6313(a)(6)(D)) In the present case, were DOE to adopt amended standards for "small" CRACs (*i.e.*, CRACs with a capacity of less than 65,000 Btu/h) at the levels specified in ASHRAE Standard 90.1, EPCA provides that the compliance date must be on or after a date which is two years after the effective date of level specified in the updated ASHRAE Standard 90.1 (i.e., October 23, 2021). Were DOE to adopt amended standards for "large" and "very large" CRACs (i.e., CRACs with a capacity equal to or greater than 65,000 Btu/h) at the levels specified in ASHRAE Standard 90.1, EPCA provides that the compliance date must be on or after a date which is three years after the effective date of the level specified in the updated ASHRAE Standard 90.1 (i.e., October 23, 2022).

If DOE were to prescribe standards more stringent than the efficiency levels contained in ASHRAE Standard 90.1-2019, EPCA dictates that any such standard will become effective for equipment manufactured on or after a date which is four years after the date of publication of a final rule in the *Federal Register*. (42 U.S.C. 6313(a)(6)(D)) For equipment classes for which DOE is acting under its 6-year lookback authority, if DOE were to adopt more-stringent standards, EPCA states that any such standard shall apply to equipment manufactured after a date that is the latter of the date three years after publication of the final rule establishing such standard or six years after the effective date for the current standard. (42 U.S.C. 6313(a)(6)(C)(iv))

Moreover, the proposed energy conservation standards are based on a new metric (*i.e.*, NSenCOP) and DOE has proposed to amend the test procedure to rely on NSenCOP in the February 2022 CRAC TP NOPR. 87 FR 6948. Were DOE to adopt the proposed test procedure, beginning 360 days following the final test procedure rule, manufacturers would be prohibited from making representations respecting the energy consumption of CRACs, unless such equipment has been tested in accordance with such test procedure and such representation fairly discloses the results of such testing. (42 U.S.C. 6314(d)(1))

DOE has considered these various applicable lead times relevant under EPCA to standards (*i.e.*, October 23, 2021, for "small" CRACs and October 23, 2022 for "large" and "very large" CRACs) and the one-year lead time relevant to a test procedure update addressing NSenCOP. In order to align the compliance dates across equipment classes and account for an updated test procedure, should one be finalized, DOE proposes that the compliance date for amended standards for all CRAC equipment classes would be 360 days after the publication date of the final rule adopting amended energy conservation standards.

VI. Procedural Issues and Regulatory Review

A. Review Under Executive Orders 12866 and 13563

Section 1(b)(1) of Executive Order ("E.O.") 12866, "Regulatory Planning and Review," 58 FR 51735 (Oct. 4, 1993), requires each agency to identify the problem that it intends to address, including, where applicable, the failures of private markets or public institutions that warrant new agency action, as well as to assess the significance of that problem. The problems that the proposed standards set forth in this NOPR are intended to address are as follows:

(1) Insufficient information and the high costs of gathering and analyzing relevant information leads some consumers to miss opportunities to make cost-effective investments in energy efficiency.

(2) In some cases, the benefits of more-efficient equipment are not realized due to misaligned incentives between purchasers and users. An example of such a case is when the equipment purchase decision is made by a building contractor or building owner who does not pay the energy costs.

(3) There are external benefits resulting from improved energy efficiency of appliances and equipment that are not captured by the users of such products. These benefits include externalities related to public health, environmental protection, and national energy security that are not reflected in energy prices, such as reduced emissions of air pollutants and greenhouse gases that impact human health and global warming.

The Administrator of the Office of Information and Regulatory Affairs (OIRA) in the Office of Management and Budget (OMB) has determined that this regulatory action is not a significant regulatory action under section 3(f) of Executive Order 12866. Accordingly, DOE has not prepared a regulatory impact analysis for this proposed rule, and OIRA in the OMB has not reviewed this proposed rule.

DOE has also reviewed this proposed regulation pursuant to E.O. 13563, issued on January 18, 2011. 76 FR 3281 (Jan. 21, 2011). E.O. 13563 is supplemental to and explicitly reaffirms the principles, structures, and definitions governing regulatory review established in E.O. 12866. To the extent permitted by law, agencies are required by E.O. 13563 to (1) propose or adopt a regulation only upon a reasoned determination that its benefits justify its costs (recognizing that some benefits and costs are difficult to quantify); (2) tailor regulations to impose the least burden on society, consistent with obtaining regulatory objectives, taking into account, among other things, and to the extent practicable, the costs of cumulative regulations; (3) select, in choosing among alternative regulatory approaches, those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity); (4) to the extent feasible, specify performance objectives, rather than specifying the behavior or manner of compliance that regulated entities must adopt;

and (5) identify and assess available alternatives to direct regulation, including providing economic incentives to encourage the desired behavior, such as user fees or marketable permits, or providing information upon which choices can be made by the public.

DOE emphasizes as well that E.O. 13563 requires agencies to use the best available techniques to quantify anticipated present and future benefits and costs as accurately as possible. In its guidance, OIRA has emphasized that such techniques may include identifying changing future compliance costs that might result from technological innovation or anticipated behavioral changes. For the reasons stated in the preamble, this NOPR is consistent with these principles.

B. Review Under the Regulatory Flexibility Act

The Regulatory Flexibility Act (5 U.S.C. 601 *et seq*.) requires preparation of an initial regulatory flexibility analysis (IRFA) for any rule that by law must be proposed for public comment, unless the agency certifies that the rule, if promulgated, will not have a significant economic impact on a substantial number of small entities. As required by E.O. 13272, "Proper Consideration of Small Entities in Agency Rulemaking," 67 FR 53461 (Aug. 16, 2002), DOE published procedures and policies on February 19, 2003, to ensure that the potential impacts of its rules on small entities are properly considered during the rulemaking process. 68 FR 7990. DOE has made its procedures and policies available on the Office of the General Counsel's website (*www.energy.gov/gc/office-general-counsel*). DOE reviewed this proposed rule under the provisions of the Regulatory Flexibility Act and the policies and procedures published on February 19, 2003.

The following sections detail DOE's IRFA for this energy conservation standards rulemaking.

1. Description of Reasons Why Action Is Being Considered

DOE is proposing to amend the existing DOE minimum efficiency standards for CRACs as is required under EPCA's ASHRAE trigger requirement and the six-year lookback provision. DOE must update the Federal minimum efficiency standards to be consistent with levels published in ASHRAE Standard 90.1, unless DOE determines, supported by clear and convincing evidence, that adoption of a more stringent level would produce significant additional conservation of energy and would be technologically feasible and economically justified. (42 U.S.C. 6313(a)(6)(A)(ii) DOE must also review and determine whether to amend standards of each class of covered equipment in ASHRAE Standard 90.1 every 6 years. (42 U.S.C. 6313(a)(6)(C)(i))

2. Objectives of, and Legal Basis for, Rule

EPCA directs that if ASHRAE amends ASHRAE Standard 90.1, DOE must adopt amended standards at the new ASHRAE efficiency level, unless DOE determines, supported by clear and convincing evidence, that adoption of a more stringent level would produce significant additional conservation of energy and would be technologically feasible and economically justified. (42 U.S.C. 6313(a)(6)(A)(ii) Under EPCA, DOE must also review energy efficiency standards for CRACs every six years and either: (1) issue a notice of determination that the standards do not need to be amended as adoption of a more stringent level is not supported by clear and convincing evidence; or (2) issue a notice of proposed rulemaking including new proposed standards based on certain criteria and procedures in subparagraph (B) (42 U.S.C. 6313(a)(6)(C)).

3. Description on Estimated Number of Small Entities Regulated

For manufacturers of CRACs, the Small Business Administration (SBA) has set a size threshold, which defines those entities classified as "small businesses" for the purposes of the statute. DOE used the SBA's small business size standards to determine whether any small entities would be subject to the requirements of the rule. *See* 13 CFR part 121. The equipment covered by this proposed rule are classified under North American Industry Classification System (NAICS) code 333415,[22] "Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing." In 13 CFR 121.201, the SBA sets a threshold of 1,250 employees or fewer for an entity to be considered as a small business for this category.

DOE used publicly available information to identify potential small businesses that manufacture equipment covered this this rulemaking. DOE identified ten manufacturers of equipment covered by this rulemaking. Of the ten, nine manufacturers are original equipment manufacturers (OEM). DOE screened out companies that do not meet the definition of a "small business" or are foreign-owned and operated. DOE used subscription-based business information tools to determine head count and revenue of the small businesses. Of these nine OEMs, DOE identified three companies that are small, domestic OEMs.

Issue 1: DOE seeks comment on the number of small manufacturers producing covered CRACs.

4. Description and Estimate of Compliance Requirements

[22] The business size standards are listed by NAICS code and industry description and are available at: *www.sba.gov/document/support--table-size-standards* (Last accessed July 26th, 2021)

As noted in the section 2 of the Review under the Regulatory Flexibility Act, DOE must adopt amended standards at the new ASHRAE efficiency level unless DOE determines, supported by clear and convincing evidence, that adoption of a more stringent standard would produce significant additional conservation of energy and would be technologically feasible and economically justified. (42 U.S.C. 6313(a)(6)(A)(ii) Because DOE proposes no such determination, this NOPR proposes to adopt amended standards at the new ASHRAE efficiency level rather than impose more stringent standards. This is required by EPCA, but is also less burdensome for small manufacturers than a more stringent standard.

In reviewing all commercially available models in DOE's Compliance Certification Database, the three small manufacturers account for 13 percent of industry model offerings. For each of the three small manufacturers, approximately 90 percent of current models would meet the proposed levels. The small manufacturers would need to either discontinue or redesign non-compliant models. DOE recognizes that small manufacturers may need to spread redesign costs over lower shipment volumes than the industry-at-large. However, adoption of standards at least as stringent as the ASHRAE levels is required under EPCA; furthermore, adopting standards above ASHRAE levels (DOE's only other option under 42 U.S.C. 6313(a)(6)(A)(ii)) would lead to an even greater portion of models requiring redesign.

Issue 2: DOE requests comment on its understanding of the current market accounted for by small manufacturers. DOE also requests comment on its understanding of the efficiency of the equipment offered by such manufacturers.

5. Duplication, Overlap, and Conflict with Other Rules and Regulations

DOE is not aware of any rules or regulations that duplicate, overlap, or conflict with this rule.

6. Significant Alternatives to the Rule

As EPCA requires DOE to either adopt the ASHRAE Standard 90.1 levels or to propose higher standards, DOE lacks discretion to mitigate impacts to small businesses from the ASHRAE Standard 90.1 levels. In this rulemaking, DOE is proposing to adopt the ASHRAE 90.1-2019 levels.

Additional compliance flexibilities may be available through other means. Section 504 of the Department of Energy Organization Act, 42 U.S.C. 7194, provides authority for the Secretary to adjust a rule issued under EPCA in order to prevent "special hardship, inequity, or unfair distribution of burdens" that may be imposed on that manufacturer as a result of such rule. Manufacturers should refer to 10 CFR part 1003 for additional detail.

C. Review Under the Paperwork Reduction Act

Manufacturers of CRACs must certify to DOE that their products comply with any applicable energy conservation standards. In certifying compliance, manufacturers must test their products according to the DOE test procedures for CRACs, including any amendments adopted for those test procedures. DOE has established regulations for the certification and recordkeeping requirements for all covered consumer products and commercial equipment, including CRACs. (See generally 10 CFR part 429) The collection-of-information requirement for the certification and recordkeeping is subject to review and approval by OMB under the Paperwork Reduction Act (PRA). This requirement has been approved by OMB under OMB control number 1910-1400. Public reporting burden for the certification is estimated to average 35 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

Notwithstanding any other provision of the law, no person is required to respond to, nor shall any person be subject to a penalty for failure to comply with, a collection of information subject to the requirements of the PRA, unless that collection of information displays a currently valid OMB Control Number.

D. Review Under the National Environmental Policy Act of 1969

DOE is analyzing this proposed regulation in accordance with the National Environmental Policy Act of 1969 (NEPA) and DOE's NEPA implementing regulations (10 CFR part 1021). DOE's regulations include a categorical exclusion for rulemakings that establish energy conservation standards for consumer products or industrial equipment. 10 CFR part 1021, subpart D, appendix B5.1. DOE anticipates that this rulemaking qualifies for categorical exclusion B5.1 because it is a rulemaking that establishes energy conservation standards for consumer products or industrial equipment, none of the exceptions identified in categorical exclusion B5.1(b) apply, no extraordinary circumstances exist that require further environmental analysis, and it otherwise meets the requirements for application of a categorical exclusion. *See* 10 CFR 1021.410. DOE will complete its NEPA review before issuing the final rule.

E. Review Under Executive Order 13132

E.O. 13132, "Federalism," 64 FR 43255 (Aug. 10, 1999), imposes certain requirements on Federal agencies formulating and implementing policies or regulations that preempt State law or that have federalism implications. The Executive order requires agencies to examine the constitutional and statutory authority supporting any action that would limit the policymaking discretion of the States and to carefully assess the necessity for such actions. The Executive order also requires agencies to have an accountable process to ensure meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications. On March 14, 2000, DOE published a statement of policy describing the intergovernmental consultation process it will follow in the development of such regulations. 65 FR 13735. DOE has examined this proposed rule and has tentatively determined that it would not have a substantial direct effect on the States, on the relationship between the National Government and the States, or on the distribution of power and responsibilities among the various levels of government. EPCA governs and prescribes Federal preemption of State regulations as to energy conservation for the products that are the subject of this proposed rule. States can petition DOE for exemption from such preemption to the extent, and based on criteria, set forth in EPCA. (42 U.S.C. 6297) Therefore, no further action is required by Executive Order 13132.

F. Review Under Executive Order 12988

With respect to the review of existing regulations and the promulgation of new regulations, section 3(a) of E.O. 12988, "Civil Justice Reform," imposes on Federal agencies the general duty to adhere to the following requirements: (1) eliminate drafting errors and ambiguity, (2) write regulations to minimize litigation, (3) provide a clear legal standard for affected conduct rather than a general standard, and (4) promote simplification and burden reduction. 61 FR 4729 (Feb. 7, 1996). Regarding the review required by section 3(a), section 3(b) of E.O. 12988 specifically requires that Executive agencies make every reasonable effort to ensure that the regulation: (1) clearly specifies the preemptive effect, if any, (2) clearly specifies any effect on existing Federal law or regulation, (3) provides a clear legal standard for affected conduct while promoting simplification and burden reduction, (4) specifies the retroactive effect, if any, (5) adequately defines key terms, and (6) addresses other important issues affecting clarity and general draftsmanship under any guidelines issued by the Attorney General. Section 3(c) of Executive Order 12988 requires Executive agencies to review regulations in light of applicable standards in section 3(a) and section 3(b) to determine whether they are met, or it is unreasonable to meet one or more of them. DOE has completed the required review and determined that, to the extent permitted by law, this proposed rule meets the relevant standards of E.O. 12988.

G. Review Under the Unfunded Mandates Reform Act of 1995

Title II of the Unfunded Mandates Reform Act of 1995 (UMRA) requires each Federal agency to assess the effects of Federal regulatory actions on State, local, and Tribal governments and the private sector. Pub. L. 104-4, section 201 (codified at 2 U.S.C. 1531). For a proposed regulatory action likely to result in a rule that may cause the expenditure by State, local, and Tribal governments, in the aggregate, or by the private sector of $100 million or more in any one year (adjusted annually for inflation), section 202 of UMRA requires a Federal agency to publish a written statement that estimates the resulting costs, benefits, and other effects on the national economy. (2 U.S.C. 1532(a), (b)) The UMRA also requires a Federal agency to develop an effective process to permit timely input by elected officers of State, local, and Tribal governments on a proposed "significant intergovernmental mandate," and requires an agency plan for giving notice and opportunity for timely input to potentially affected small governments before establishing any requirements that might significantly or uniquely affect them. On March 18, 1997, DOE published a statement of policy on its process for intergovernmental consultation under UMRA. 62 FR 12820. DOE's policy statement is also available at *energy.gov/sites/prod/files/gcprod/documents/umra_97.pdf*.

This proposed rule does not contain a Federal intergovernmental mandate, nor is it expected to require expenditures of $100 million or more in any one year by the private sector. As a result, the analytical requirements of UMRA do not apply.

H. Review Under the Treasury and General Government Appropriations Act, 1999

Section 654 of the Treasury and General Government Appropriations Act, 1999 (Pub. L. 105-277) requires Federal agencies to issue a Family Policymaking Assessment for any rule that may affect family well-being. This rule would not have any impact on the autonomy or integrity of the family as an institution. Accordingly, DOE has concluded that it is not necessary to prepare a Family Policymaking Assessment.

I. Review Under Executive Order 12630

Pursuant to E.O. 12630, "Governmental Actions and Interference with Constitutionally Protected Property Rights," 53 FR 8859 (Mar. 15, 1988), DOE has determined that this proposed rule would not result in any takings that might require compensation under the Fifth Amendment to the U.S. Constitution.

J. Review Under the Treasury and General Government Appropriations Act, 2001

Section 515 of the Treasury and General Government Appropriations Act, 2001 (44 U.S.C. 3516 note) provides for Federal agencies to review most disseminations of information to the public under information quality guidelines established by each agency pursuant to general guidelines issued by OMB. OMB's guidelines were published at 67 FR 8452 (Feb. 22, 2002), and DOE's guidelines were published at 67 FR 62446 (Oct. 7, 2002). Pursuant to OMB Memorandum M-19-15, Improving Implementation of the Information Quality Act (April 24, 2019), DOE published updated guidelines which are available at *www.energy.gov/sites/prod/files/2019/12/f70/DOE%20Final%20Updated%20IQA%20Guidelines%20Dec%202019.pdf*. DOE has reviewed this NOPR under the OMB and DOE guidelines and has concluded that it is consistent with applicable policies in those guidelines.

K. Review Under Executive Order 13211

E.O. 13211, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," 66 FR 28355 (May 22, 2001), requires Federal agencies to prepare and submit to OIRA at OMB, a Statement of Energy Effects for any proposed significant energy action. A "significant energy action" is defined as any action by an agency that promulgates or is expected to lead to promulgation of a final rule, and that (1) is a significant regulatory action under Executive Order 12866, or any successor order; and (2) is likely to have a significant adverse effect on the supply, distribution, or use of energy, or (3) is designated by the Administrator of OIRA as a significant energy action. For any proposed significant energy action, the agency must give a detailed statement of any adverse effects on energy supply, distribution, or use should the proposal be implemented, and of reasonable alternatives to the action and their expected benefits on energy supply, distribution, and use.

DOE has tentatively concluded that this regulatory action, which proposes amended energy conservation standards for CRACs, is not a significant energy action because the proposed standards are not likely to have a significant adverse effect on the supply, distribution, or use of energy, nor has it been designated as such by the Administrator at OIRA. Accordingly, DOE has not prepared a Statement of Energy Effects on this proposed rule.

L. Information Quality

On December 16, 2004, OMB, in consultation with the Office of Science and Technology Policy (OSTP), issued its Final Information Quality Bulletin for Peer Review (the Bulletin). 70 FR 2664 (Jan. 14, 2005). The Bulletin establishes that certain scientific information shall be peer reviewed by qualified specialists before it is disseminated by the Federal Government, including influential scientific information related to agency regulatory actions. The purpose of the bulletin is to enhance the quality and credibility of the Government's scientific information. Under the Bulletin, the energy conservation standards rulemaking analyses are "influential scientific information," which the Bulletin defines as "scientific information the agency reasonably can determine will have, or does have, a clear and substantial impact on important public policies or private sector decisions." 70 FR 2664, 2667.

In response to OMB's Bulletin, DOE conducted formal peer reviews of the energy conservation standards development process and the analyses that are typically used and has prepared a report describing that peer review.[23] Generation of this report involved a rigorous, formal, and documented evaluation using objective criteria and qualified and independent reviewers to make a judgment as to the technical/scientific/business merit, the actual or anticipated results, and the productivity

---

[23] The 2007 "Energy Conservation Standards Rulemaking Peer Review Report" is available at the following website: *energy.gov/eere/buildings/downloads/energy-conservation-standards-rulemaking-peer-review-report-0*.

and management effectiveness of programs and/or projects. DOE has determined that the peer-reviewed analytical process continues to reflect current practice, and the Department followed that process for developing energy conservation standards in the case of the present rulemaking.

VII. Public Participation

A. Participation in the Webinar

The time and date of the webinar meeting are listed in the **DATES** section at the beginning of this document. Webinar registration information, participant instructions, and information about the capabilities available to webinar participants will be published on DOE's website: www.energy.gov/eere/buildings/public-meetings-and-comment-deadlines. Participants are responsible for ensuring their systems are compatible with the webinar software.

B. Procedure for Submitting Prepared General Statements for Distribution

Any person who has an interest in the topics addressed in this document, or who is representative of a group or class of persons that has an interest in these issues, may request an opportunity to make an oral presentation at the webinar. Such persons may submit to *ApplianceStandardsQuestions@ee.doe.gov*. Persons who wish to speak should include with their request a computer file in WordPerfect, Microsoft Word, PDF, or text (ASCII) file format that briefly describes the nature of their interest in this rulemaking and the topics they wish to discuss. Such persons should also provide a daytime telephone number where they can be reached.

Persons requesting to speak should briefly describe the nature of their interest in this rulemaking and provide a telephone number for contact. DOE requests persons selected to make an oral presentation to submit an advance copy of their statements at least two weeks before the webinar. At its discretion, DOE may permit persons who cannot supply an advance copy of their statement to participate, if those persons have made advance alternative arrangements with the Building Technologies Office. As necessary, requests to give an oral presentation should ask for such alternative arrangements.

C. Conduct of the Webinar

DOE will designate a DOE official to preside at the webinar and may also use a professional facilitator to aid discussion. The meeting will not be a judicial or evidentiary-type public hearing, but DOE will conduct it in accordance with section 336 of EPCA (42 U.S.C. 6306). A court reporter will be present to record the proceedings and prepare a transcript. DOE reserves the right to schedule the order of presentations and to establish the procedures governing the conduct of the webinar/public meeting. There shall not be discussion of proprietary information, costs or prices, market share, or other commercial matters regulated by U.S. anti-trust laws. After the webinar and until the end of the comment period, interested parties may submit further comments on the proceedings and any aspect of the rulemaking.

The webinar will be conducted in an informal, conference style. DOE will present a general overview of the topics addressed in this rulemaking, allow time for prepared general statements by participants, and encourage all interested parties to share their views on issues affecting this rulemaking. Each participant will be allowed to make a general statement (within time limits determined by DOE), before the discussion of specific topics. DOE will permit, as time permits, other participants to comment briefly on any general statements.

At the end of all prepared statements on a topic, DOE will permit participants to clarify their statements briefly. Participants should be prepared to answer questions by DOE and by other participants concerning these issues. DOE representatives may also ask questions of participants concerning other matters relevant to this proposed rulemaking. The official conducting the webinar will accept additional comments or questions from those attending, as time permits. The presiding official will announce any further procedural rules or modification of the above procedures that may be needed for the proper conduct of the webinar.

A transcript of the webinar will be included in the docket, which can be viewed as described in the *Docket* section at the beginning of this NOPR. In addition, any person may buy a copy of the transcript from the transcribing reporter.

D. Submission of Comments

DOE will accept comments, data, and information regarding this proposed rule before or after the public meeting, but no later than the date provided in the **DATES** section at the beginning of this proposed rule. Interested parties may submit comments, data, and other information using any of the methods described in the **ADDRESSES** section at the beginning of this document.

Submitting comments via *www.regulations.gov*. The *www.regulations.gov* webpage will require you to provide your name and contact information. Your contact information will be viewable to DOE Building Technologies staff only. Your contact information will not be publicly viewable except for your first and last names, organization name (if any), and submitter representative name (if any). If your comment is not processed properly because of technical difficulties, DOE will use this information to contact you. If DOE cannot read your comment due to technical difficulties and cannot contact you for clarification, DOE may not be able to consider your comment.

However, your contact information will be publicly viewable if you include it in the comment itself or in any documents attached to your comment. Any information that you do not want to be publicly viewable should not be included in your comment, nor in any document attached to your comment. Otherwise, persons viewing comments will see only first and last names, organization names, correspondence containing comments, and any documents submitted with the comments.

Do not submit to *www.regulations.gov* information for which disclosure is restricted by statute, such as trade secrets and commercial or financial information (hereinafter referred to as Confidential Business Information (CBI). Comments submitted through *www.regulations.gov* cannot be claimed as CBI. Comments received through the website will waive any CBI claims for the information submitted. For information on submitting CBI, see the Confidential Business Information section.

DOE processes submissions made through *www.regulations.gov* before posting. Normally, comments will be posted within a few days of being submitted. However, if large volumes of comments are being processed simultaneously, your comment may not be viewable for up to several weeks. Please keep the comment tracking number that *www.regulations.gov* provides after you have successfully uploaded your comment.

Submitting comments via email. Comments and documents submitted via email also will be posted to *www.regulations.gov*. If you do not want your personal contact information to be publicly viewable, do not include it in your comment or any accompanying documents. Instead, provide your contact information in a cover letter.

Include your first and last names, email address, telephone number, and optional mailing address. The cover letter will not be publicly viewable as long as it does not include any comments

Include contact information each time you submit comments, data, documents, and other information to DOE. No telefacsimiles (faxes) will be accepted.

Comments, data, and other information submitted to DOE electronically should be provided in PDF (preferred), Microsoft Word or Excel, or text (ASCII) file format. Provide documents that are not secured, that are written in English, and that are free of any defects or viruses. Documents should not contain special characters or any form of encryption and, if possible, they should carry the electronic signature of the author.

Campaign form letters. Please submit campaign form letters by the originating organization in batches of between 50 to 500 form letters per PDF or as one form letter with a list of supporters' names compiled into one or more PDFs. This reduces comment processing and posting time.

Confidential Business Information. Pursuant to 10 CFR 1004.11, any person submitting information that he or she believes to be confidential and exempt by law from public disclosure should submit via email two well-marked copies: one copy of the document marked "confidential" including all the information believed to be confidential, and one copy of the document marked "non-confidential" with the information believed to be confidential deleted. DOE will make its own determination about the confidential status of the information and treat it according to its determination.

It is DOE's policy that all comments may be included in the public docket, without change and as received, including any personal information provided in the comments (except information deemed to be exempt from public disclosure).

E. Issues on Which DOE Seeks Comment

Although DOE welcomes comments on any aspect of this proposal, DOE is particularly interested in receiving comments and views of interested parties concerning the following issues:

Issue 1: DOE seeks comment on the number of small manufacturers producing covered CRACs.

Issue 2: DOE requests comment on its understanding of the current market accounted for by small manufacturers. DOE also requests comment on its understanding of the efficiency of the equipment offered by such manufacturers.

VIII. Approval of the Office of the Secretary

The Secretary of Energy has approved publication of this notice of proposed rulemaking and request for comment.

List of Subjects in 10 CFR Part 431

Administrative practice and procedure, Confidential business information, Energy conservation test procedures, Reporting and recordkeeping requirements.

Signing Authority

This document of the Department of Energy was signed on February 22, 2022, by Kelly J. Speakes-Backman, Principal Deputy Assistant Secretary for Energy Efficiency and Renewable Energy, pursuant to delegated authority from the Secretary of Energy. That document with the original signature and date is maintained by DOE. For administrative purposes only, and in compliance with requirements of the Office of the Federal Register, the undersigned DOE Federal Register Liaison Officer has been authorized to sign and submit the document in electronic format for publication, as an official document of the Department of Energy. This administrative process in no way alters the legal effect of this document upon publication in the *Federal Register*.

Signed in Washington, DC, on February 23, 2022.

Treena V. Garrett,
Federal Register Liaison Officer,
U.S. Department of Energy.

For the reasons set forth in the preamble, DOE proposes to amend part 431 of chapter II, subchapter D, of title 10 of the Code of Federal Regulations, as set forth below:

PART 431 – ENERGY EFFICIENCY PROGRAM FOR CERTAIN COMMERCIAL AND INDUSTRIAL EQUIPMENT

1. The authority citation for part 431 continues to read as follows:

Authority: 42 U.S.C. 6291-6317; 28 U.S.C. 2461 note.

2. Section 431.92 is amended by adding, in alphabetical order, the definition for “Ducted Condenser” to read as follows:

§431.92 Definitions concerning commercial air conditioners and heat pumps.

* * * * *

Ducted Condenser means a configuration of *computer room air conditioner* for which the condenser or condensing unit that manufacturer’s installation instructions indicate is intended to exhaust condenser air through a duct(s).

* * * * *

3. Section 431.97 is amended by:

a. In paragraph (f), redesignating Table 13 as Table 15; and

b. Revising paragraph (e).

The revision reads as follows:

§431.97 Energy efficiency standards and their compliance dates.

* * * * *

(e)(1) Each computer room air conditioner with a net sensible cooling capacity less than 65,000 Btu/h manufactured on or after October 29, 2012, and before [date 360 days after the publication date of the final rule], and each computer room air conditioner with a net sensible cooling capacity greater than or equal to 65,000 Btu/h manufactured on or after October 29, 2013, and before [date 360 days after the publication date of the final rule], must meet the applicable minimum energy efficiency standard level(s) set forth in Table 12 of this section.

TABLE 12 TO §431.97—MINIMUM EFFICIENCY STANDARDS FOR COMPUTER ROOM AIR CONDITIONERS

Equipment type	Net sensible cooling capacity	Minimum SCOP Efficiency	
		Downflow	Upflow
Air-Cooled	<65,000 Btu/h	2.20	2.09
	≥65,000 Btu/h and <240,000 Btu/h	2.10	1.99
	≥240,000 Btu/h and <760,000 Btu/h	1.90	1.79
Water-Cooled	<65,000 Btu/h	2.60	2.49
	≥65,000 Btu/h and <240,000 Btu/h	2.50	2.39
	≥240,000 Btu/h and <760,000 Btu/h	2.40	2.29
Water-Cooled with a Fluid Economizer	<65,000 Btu/h	2.55	2.44
	≥65,000 Btu/h and <240,000 Btu/h	2.45	2.34
	≥240,000 Btu/h and <760,000 Btu/h	2.35	2.24
Glycol-Cooled	<65,000 Btu/h	2.50	2.39
	≥65,000 Btu/h and <240,000 Btu/h	2.15	2.04
	≥240,000 Btu/h and <760,000 Btu/h	2.10	1.99
Glycol-Cooled with a Fluid Economizer	<65,000 Btu/h	2.45	2.34
	≥65,000 Btu/h and <240,000 Btu/h	2.10	1.99
	≥240,000 Btu/h and <760,000 Btu/h	2.05	1.94

(2) Each computer room air conditioner manufactured on or after [date 360 days after the publication date of the final rule], must meet the applicable minimum energy efficiency standard level(s) set forth in Table 13 and Table 14 of this section.

TABLE 13 TO §431.97—UPDATED MINIMUM EFFICIENCY STANDARDS FOR FLOOR-MOUNTED COMPUTER ROOM AIR CONDITIONERS

Equipment Type	Downflow and Upflow Ducted			Upflow Non-Ducted and Horizontal Flow		
	Net sensible cooling capacity	Minimum NSenCOP efficiency		Net sensible cooling capacity	Minimum NSenCOP efficiency	
		Downflow	Upflow ducted		Upflow non-ducted	Horizontal flow
Computer Room Air Conditioners, Floor-Mounted, Air-Cooled	<80,000 Btu/h	2.70	2.67	<65,000 Btu/h	2.16	2.65
	≥80,000 Btu/h and <295,000 Btu/h	2.58	2.55	≥65,000 Btu/h and <240,000 Btu/h	2.04	2.55
	≥295,000 Btu/h and <930,000 Btu/h	2.36	2.33	≥240,000 Btu/h and <760,000 Btu/h	1.89	2.47
Computer Room Air Conditioners, Floor-Mounted, Air-Cooled with Fluid Economizer	<80,000 Btu/h	2.70	2.67	<65,000 Btu/h	2.09	2.65
	≥80,000 Btu/h and <295,000 Btu/h	2.58	2.55	≥65,000 Btu/h and <240,000 Btu/h	1.99	2.55
	≥295,000 Btu/h and <930,000 Btu/h	2.36	2.33	≥240,000 Btu/h and <760,000 Btu/h	1.81	2.47
Computer Room Air Conditioners, Floor-Mounted, Water-Cooled	<80,000 Btu/h	2.82	2.79	<65,000 Btu/h	2.43	2.79
	≥80,000 Btu/h and <295,000 Btu/h	2.73	2.70	≥65,000 Btu/h and <240,000 Btu/h	2.32	2.68
	≥295,000 Btu/h and <930,000 Btu/h	2.67	2.64	≥240,000 Btu/h and <760,000 Btu/h	2.20	2.60
Computer Room Air Conditioners, Floor-Mounted, Water-Cooled with a Fluid Economizer	<80,000 Btu/h	2.77	2.74	<65,000 Btu/h	2.35	2.71
	≥80,000 Btu/h and <295,000 Btu/h	2.68	2.65	≥65,000 Btu/h and <240,000 Btu/h	2.24	2.60
	≥295,000 Btu/h and <930,000 Btu/h	2.61	2.58	≥240,000 Btu/h and <760,000 Btu/h	2.12	2.54
Computer Room Air Conditioners, Floor-Mounted, Glycol-Cooled	<80,000 Btu/h	2.56	2.53	<65,000 Btu/h	2.08	2.48
	≥80,000 Btu/h and <295,000 Btu/h	2.24	2.21	≥65,000 Btu/h and <240,000 Btu/h	1.90	2.18
	≥295,000 Btu/h and <930,000 Btu/h	2.21	2.18	≥240,000 Btu/h and <760,000 Btu/h	1.81	2.18
Computer Room Air Conditioner, Floor-Mounted, Glycol-Cooled with a Fluid Economizer	<80,000 Btu/h	2.51	2.48	<65,000 Btu/h	2.00	2.44
	≥80,000 Btu/h and <295,000 Btu/h	2.19	2.16	≥65,000 Btu/h and <240,000 Btu/h	1.82	2.10
	≥295,000 Btu/h and <930,000 Btu/h	2.15	2.12	≥240,000 Btu/h and <760,000 Btu/h	1.73	2.10

TABLE 14 TO §431.97— MINIMUM EFFICIENCY STANDARDS FOR CEILING-MOUNTED COMPUTER ROOM AIR CONDITIONERS

Equipment type	Net sensible cooling capacity	Minimum NSenCOP efficiency	
		Ducted	Non-Ducted
Air-Cooled with Free Air Discharge Condenser	<29,000 Btu/h	2.05	2.08
	≥29,000 Btu/h and <65,000 Btu/h	2.02	2.05
	≥65,000 Btu/h	1.92	1.94
Air-Cooled with Free Air Discharge Condenser and Fluid Economizer	<29,000 Btu/h	2.01	2.04
	≥29,000 Btu/h and <65,000 Btu/h	1.97	2
	≥65,000 Btu/h	1.87	1.89
Air-Cooled with Ducted Condenser	<29,000 Btu/h	1.86	1.89
	≥29,000 Btu/h and <65,000 Btu/h	1.83	1.86
	≥65,000 Btu/h	1.73	1.75
Air-Cooled with Fluid Economizer and Ducted Condenser	<29,000 Btu/h	1.82	1.85
	≥29,000 Btu/h and <65,000 Btu/h	1.78	1.81
	≥65,000 Btu/h	1.68	1.7
Water-Cooled	<29,000 Btu/h	2.38	2.41
	≥29,000 Btu/h and <65,000 Btu/h	2.28	2.31
	≥65,000 Btu/h	2.18	2.2
Water-Cooled with Fluid Economizer	<29,000 Btu/h	2.33	2.36
	≥29,000 Btu/h and <65,000 Btu/h	2.23	2.26
	≥65,000 Btu/h	2.13	2.16
Glycol-Cooled	<29,000 Btu/h	1.97	2
	≥29,000 Btu/h and <65,000 Btu/h	1.93	1.98
	≥65,000 Btu/h	1.78	1.81
Glycol-Cooled with Fluid Economizer	<29,000 Btu/h	1.92	1.95
	≥29,000 Btu/h and <65,000 Btu/h	1.88	1.93

	≥65,000 Btu/h	1.73	1.76

*   *   *   *   *

<FRDOC> [FR Doc. 2022–04151 Filed 3–4–22; 8:45 am]
<BILCOD> BILLING CODE 6450–01–P

[FR Doc. 2022-04151 Filed: 3/4/2022 8:45 am; Publication Date: 3/7/2022]